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MANAGEMENT OF CHEST INJURIES

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Wars accelerate interest and experience in the treatment of injuries; however, with the cessation of hostilities, interest lags, in spite of numerous civilian injuries incurred in automobile and industrial accidents. The experiences in World War II revolutionized the treatment of chest injuries: techniques were improved, the physiology of the thorax was better understood, and trained surgical teams were able to handle chest injuries rapidly and efficiently. Even with the extensive information on this subject, there is little specific information for training emergency teams in the proper handling of patients with chest injuries before they come into the hands of a trained surgeon. In this article, we have enumerated the specific treatments for patients with chest injuries from the time they are placed in the ambulance until the treatment is concluded.

EMERGENCY TREATMENT

Emergency Treatment in the Ambulance.—Emergency treatment should start in the ambulance. Persons injured in isolated areas often have to be transported long distances by surface or air ambulance. Ambulance attendants can be trained, as were Army Corps men, to carry out certain specific emergency procedures in patients with chest injuries. The impression is widespread that the use of air ambulance is contraindicated; however, we had two patients with open chest wounds who were recently flown in over the mountains at over 14,000 ft. Because attendants carefully watched the intrapleural pressures and administered oxygen, both patients were unquestionably in better condition than they would have been had they been transported by surface ambulance for the necessary 14 hours. Carson [1] reported that 500 patients with chest injuries of all grades of severity and with all of the usual complications were flown from Okinawa and Iwo Jima to Guam without fatality en route. The ambulance attendants should be taught to administer artificial respiration, seal sucking wounds, maintain a clear airway, treat tension pneumothorax, restore blood pressure, and administer oxygen and narcotics.

There are various methods of artificial respiration. Beecher [2] considers the modified Sylvester method as the least exhausting to the rescuer. The National Research Council [3] has recently recommended the Holger Neilson method. In this latter system, the person needing resuscitation is laid face down with his arms folded and his hands under his face. The operator kneels on either side of the victim's head and first presses on his ribs to evacuate his lungs. Then he lifts and pulls the victim's folded arms upward and toward himself as he sways backward, grasping the victim's arms above the elbows. The operator tries to get through this cycle once every five seconds.

Sucking wounds of the chest are those in which a hole in the chest wall causes an audible noise with each respiration. They should be sealed at once with an air-tight dressing of petrolatum gauze and adhesive tape. Skinner and his associates [4] have explained the consecutive physiological effects of an unsealed sucking wound: (1) collapse of the homolateral lung, (2) shift of the mediastinum toward the contralateral side, (3) swinging mediastinum, and (4) exchange of air between the two lungs. A patient with an open sucking wound soon goes into physiological shock, which is unrelated to blood loss and which no amount of blood or plasma will remedy until the physiological disturbance itself is corrected.

Palpable rales indicate a dangerous accumulation of secretion in the tracheobronchial tree (Williams [5]). The patient with blood and secretions in his air passages will remain in shock, become cyanotic, and may die of respiratory failure. The ambulance attendant should place the patient in the Trendelenburg position, encourage cough-

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1. Carson, L. D.: Experiences in Air Transportation of Patients with War Wounds of the Chest, Dis. Chest **14**: 254-260 (March-April) 1948.
2. Beecher, H. K.: Early Care of the Seriously Wounded Man, J. A. M. A. **145**: 193-200 (Jan. 27) 1951.
3. Back Pressure-Arm Lift Method for Administering Artificial Respiration Recommended: Council on Physical Medicine and Rehabilitation, J. A. M. A. **147**: 1454 (Dec. 8) 1951.
4. Skinner, E. F.; Carr, D.; Kessler, C. R., and Denman, W. E.: Chest Injuries in Civilian Practice, Dis. Chest **18**: 363 (Oct.) 1950.
5. Williams, M. H.: Intrabronchial Hemorrhage in Battle Casualties, J. Thoracic Surg. **16**: 342-352 (Aug.) 1947.

ing, and suck out accumulated secretions. Ambulances should be equipped with suction and the attendants taught to insert a catheter through the nose into the trachea to clear the air passages.

Tension pneumothorax is more difficult to diagnose and treat than other emergencies but must be dealt with in the ambulance, particularly air ambulance. Tension pneumothorax occurs when there is an unsealed leak from the lung into the pleural cavity with the chest wall air-tight. The best sign of it is deviation of the trachea from the midline away from the air-filled hemithorax, and other signs are dyspnea, cyanosis, and shock. In emergency treatment a no. 15 needle with a short bevel is inserted into the chest cavity on the side that is filled with air under pressure. A flutter valve is made by tying a finger cot with a hole cut in the end around the needle. The needle is inserted in the second intercostal space in the midclavicular line and held in place by application of a hemostat across the needle and strapping it to the chest wall. This needle is left in place during the time the patient is being transported.

Blood pressure readings should be taken by the ambulance attendant. When the systolic blood pressure falls below 85 mm. of mercury, plasma should be given intravenously to restore the blood pressure to that level (Beecher [2]). However, in the ambulance only enough blood substitute should be used to restore the pressure to 85 mm. systolic, because, if more is used, bleeding may start again with further loss of hemoglobin. If the patient becomes cyanotic, oxygen should be administered by mask or nasal catheter while the patient is being transported.

Ambulance attendants should be cautioned against using large doses of morphine in chest injuries, to avoid depressing respiration and inhibiting the cough reflex. Beecher [2] has pointed out that a small dose of morphine, ⅙ grain (10 mg.), relieves pain as effectively as a large dose. Morphine is most effective when given with barbituates, which allay apprehension. If the patient is in shock, the morphine given subcutaneously will not be taken up in the circulation and should be administered intravenously.

Emergency Treatment in the Hospital.—The second phase of the emergency treatment of thoracic injuries is carried out in the hospital admitting room and is concerned primarily with the treatment of shock, restoration of cardiorespiratory function, and preparation for emergency surgery. Sedatives and other necessary medicaments, such as antibiotics and antitoxins, should be given. Shock may be due to blood loss, but, if the patient has cardiac tamponade, flail chest, tension pneumothorax, or an obstructed airway, he will remain in shock in spite of the administration of blood or fluids. Blood volume should now be restored by whole blood transfusions. In the severely shocked patient, arterial transfusions will restore the coronary circulation more rapidly and effectively than venous transfusion and may be lifesaving. Sodium chloride solution should not be used intravenously, because of the danger of pulmonary edema. If the patient has not recovered from shock after three hours of treatment, he is probably bleeding seriously and should be operated on to stop the bleeding even though he is still in shock.

Cardiac irregularity suggests cardiac contusion. Contusions of the heart are particularly common in automobile accidents. Skinner and associates [4] point out that physical examination may reveal little of diagnostic value but that repeated electrocardiograms can show changes similar to those seen in an acute coronary infarction. A patient with these changes should be treated as though he had myocardial infarction, with adequate bed rest and oxygen while he has dyspnea or tachycardia. Care should be exercised in administration of anesthetics to a patient with suspected contusion of the heart.

The emergency methods of maintaining a clear airway were described previously. In the hospital admitting room, bronchoscopy may be done and, when bleeding is severe enough to require continuous suction, a tracheotomy should be performed. The gastric contents should be aspirated before the injured person is sent to the operating room, because the stomach often will not empty for many hours after an injury. Serious accidents can be avoided if the stomach is emptied before an anesthetic is administered.

EVALUATION OF INJURIES

Emergency surgery requires the same careful diagnosis as elective surgery.

History and Physical Examination.—It takes only a few minutes to get a history of the injury from the patient or the attendant. A history of hemoptysis after the accident, unconsciousness, urinary retention, or the previous administration of tetanus toxoid is important information. All injured patients should have thorough physical examinations, which should include a complete neurological examination for evidence of central nervous system injury. Important signs of chest damage are subcutaneous emphysema, deviated trachea, pneumothorax, enlarged heart or irregular beat, and rib fractures. Pertinent signs in the abdomen are tenderness, rigidity, and the presence or absence of bowel sounds. The extremities should be examined for evidence of fractures. The examination should include a blood cell count, in a search for evidence of hemorrhage, and urinalysis, to determine the presence of blood.

X-Ray Examination.—Roentgenologic examinations are essential for the diagnosis of injuries and should include fluoroscopy. The patient who has a chance for recovery can tolerate the few x-rays necessary to permit a diagnosis. Chest x-rays will show the presence of pneumothorax or hemopneumothorax and also evidence of mediastinal shift. Over penetration films will best demonstrate rib fractures or foreign bodies.

It is important to know the course and position of a foreign body or missile, although this is difficult. Burbank and his associates [6] outlined excellent methods for locating a foreign body in the chest, beginning with posteroanterior and lateral x-rays of the chest. The chest is then divided into three perpendicular compartments on both x-rays; the foreign body is extrapleural if it lies outside these sectors. Fluoroscopy and spot x-rays are next used for better location. If a foreign body moves syn-

6. Burbank, B.; Burford, T. H.; Samson, P. C., and Mesirow, S.: Experience in the Localization of Thoracic Foreign Bodies, J. Thoracic Surg. **15**: 64-75 (Feb.) 1946.

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chronously with pulsations of the heart, it is either in the lung or in the mediastinum. In difficult cases, the chest should be aspirated and pneumothorax introduced. When the foreign body moves with the lung, it is intrapulmonary; when it remains stationary, it is in the chest wall. Foreign bodies about the diaphragm are notoriously difficult to locate accurately, and it is sometimes necessary to induce a diagnostic pneumoperitoneum to be sure about their exact location. Once pneumoperitoneum has been induced, posteroanterior and lateral upright x-rays are essential, with oblique and lateral decubitus views frequently necessary. If these studies produce even one view showing the foreign body above the diaphragm, then the missile must be intrathoracic and not subdiaphragmatic.

A spontaneous pneumoperitoneum is absolute evidence of a ruptured abdominal viscus and should be carefully ruled out before pneumoperitoneum is introduced for diagnosis. Moreover, with any indication of intra-abdominal infection, diagnostic pneumoperitoneum should not be used.

Cardiac fluoroscopy is particularly valuable in the diagnosis of cardiac tamponade. The routine roentgenogram of the chest can show a large cardiopericardial shadow with sharply defined edges. However, fluoroscopic examination will generally clarify the cardiac diagnosis, because there will be diminution or absence of pulsations in the cardiac silhouette.

Other diagnostic methods may give valuable information. By thoracentesis one can determine the presence of air or blood in the pleural cavity, and the intrapleural pressure can be measured if a pneumothorax exists. Paracentesis may be valuable in the diagnosis of intraperitoneal hemorrhage. The patient should be catheterized if he has not voided since his accident, so that one may determine whether damage to the urinary tract has occurred.

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EARLY OPEN THORACOTOMY

When the patient has been adequately prepared and treated for shock and proper methods have been used to obtain an accurate diagnosis, then the surgeon must decide whether immediate emergency surgery is indicated. Certain criteria will help one in making the decision. When there are multiple injuries, the location of the injuries besides the chest injuries will influence his judgment. Chest injuries requiring surgery may be cared for immediately even when they coexist with injuries to the head or extremities, for, in general, head injuries are best treated conservatively and injuries to the extremities can be splinted and operation deferred. However, when a chest injury is complicated by an abdominal injury, both the chest and abdomen should be operated on at once.

Thoracoabdominal Injuries.—Thoracoabdominal injuries present difficult diagnostic problems. We agree with Betts [7] that, if a thoracoabdominal injury seems probable, exploration must be done. The diagnosis of a perforation of the diaphragm in a penetrating chest wound is less difficult that that of a crushing injury, because the course of the missile facilitates the diagnosis. Mackler [8] said that in none of his cases had the pathway of a bullet ever deviated from a straight line through the body.

In crushing injuries, the diagnosis must be based on the results of physical examination. A patient with a rigid abdomen generally has an abdominal injury, although the rigidity may be due to reflex spasm. Absence of bowel sounds indicates a bowel injury; but bowel sounds may be present with bowel injury, so that the sign is not entirely reliable. Pneumoperitoneum can be demonstrated roentgenographically, and its presence is sufficient indication for immediate surgery. Blood obtained by paracentesis is also an indication for operation. However, if no blood is obtained by paracentesis, intra-abdominal hemorrhage cannot be excluded.

When there is a thoracoabdominal injury, the thoracotomy should be performed before, rather than after, the abdominal procedure, even though a thoracotomy would not be imperative in the absence of the abdominal injury, because as Wylie and his associates [9] state a balanced cardiorespiratory system is important in combating shock. Surgery in the abdomen is much safer after the injury to the lung has been repaired and the lung expanded.

Because most thoracoabdominal injuries involve the upper part of the abdomen, the surgical approach in these injuries should be through the chest. If the injury is on the right side, the lung should be sutured, the diaphragm and abdominal injuries repaired, and the liver area drained by a subcostal drain.[8] If the abdomen cannot be explored satisfactorily because of the presence of the liver on the right side, the incision can be extended across the costal margin. Another method consists of repairing the diaphragm and lung, closing the chest incision, and making another incision in the abdomen. On the left side, a thoracic incision with opening of the diaphragm gives an excellent exposure to the upper part of the abdomen and can also be extended across the costal margin.[10] After a thoracic approach, tubes are inserted for underwater seal suction drainage to insure reexpansion of the lung (see the accompanying figure).

Cardiac Injuries.—Penetrating wounds of the heart may produce cardiac tamponade. Moore [11] expressed the belief that 200 cc. of fluid in the normal pericardium is enough to cause circulatory failure. Skinner and his associates [4] outlined the following diagnostic signs: 1. There is venous back pressure, which can be observed in distention of the neck veins and a dusky cyanosis. 2. The pulse pressure is markedly narrowed, to about 10 mm. of mercury, even before the blood pressure falls to shock levels. 3. The heart sounds are distant or inaudible. 4. The heart rate is not fast. A decrease in the motion of the cardiac silhouette observed fluoroscopically confirms the diagnosis.

In the presence of cardiac tamponade, surgery is urgent but should be done under sterile conditions. While the operating room is being readied, the pericardium may

7. Betts, R. H.: Initial Surgery of Thoracoabdominal War Injuries, J. Thoracic Surg. **15**: 349-364 (Oct.) 1946.

8. Mackler, S. A.: Experience with Thoracic and Thoracoabdominal Wounds in an Evacuation Hospital, J. Thoracic Surg. **16**: 538-570 (Oct.) 1947.

9. Wylie, R. H.; Hoffman, H. L.; Williams, D. B., and Rose, W. F.: Thoraco-abdominal Casualty, Ann. Surg. **124**: 463-478 (Aug.) 1946.

10. Harper, F. R.: Thoracicoabdominal Approach to the Upper Abdomen, Surg., Gynec. & Obst. **84**: 331-332 (March) 1947.

11. Moore, R. L.: War Injuries of the Chest, Ann. Surg. **124**: 367-382 (Aug.) 1946.

be aspirated. The heart is best approached transpleurally through the fifth intercostal space. After the laceration in the heart has been sutured, the pericardium is left open, so that it will drain into the pleural cavity.

Thoracic Injuries.—Immediate surgery for chest injuries alone is seldom necessary. Most chest injuries are best treated conservatively at first, with definitive surgery later. However, some conditions demand immediate emergency surgery.

1. Large open chest wounds require emergency thoracotomy with débridement of the wound and closure of the sucking wound. In these wounds it is generally possible to inspect and suture the underlying lung at the time of surgery. Betts and Lees [12] stated that all open chest wounds over 6 cm. in diameter should be operated on immediately. At the completion of any open thoracotomy

Diagram of negative pressure apparatus used by us. The Steadman pump, together with the free tube under water, creates a constant negative pressure depending on the depth of the water. The method may be used in tension pneumothorax or after open chest operations.

the chest is drained by under water seal suction drainage to reexpand the lung (see the accompanying figure).

2. Massive hemorrhage into the chest following either penetrating or closed injuries constitutes an emergency. Severe intrapleural hemorrhage is generally from one of the systemic vessels; intercostals, internal mammaries, or pericardiophrenics may be the source. Betts and Lees [12] observed that the only vessels they had seen actually bleeding at the time of thoracotomy were intercostals that were incompletely divided and hence unable to retract. Jagged rib fragments in the lung can be the source of continued bleeding if they become embedded in lung tissue and prevent the sealing off of the peripheral pulmonary vessels. Chest aspirations should be repeated when the patient is not recovering from shock. If these repeated aspirations indicate continued bleeding, open thoracotomy should be done at once to determine and control the source of bleeding.

3. Ruptured trachea, bronchus, or esophagus, in fact any injury obviously involving the posterior mediastinum, should receive early operation. Rupture of the trachea or bronchus may occur in penetrating or crushing chest injuries. Kinsella and Johnsrud [13] reviewed the literature on ruptured bronchus and found that pneumothorax of varying extent frequently develops. Emphysema may be slight or extensive and is dangerous when it results from bronchial rupture within the mediastinal pleura. Complete or nearly complete bronchial occlusion occurs, with resultant atelectasis if the patient survives. In some cases of ruptured bronchus, there is tension pneumothorax that cannot be controlled by intercostal catheter drainage and requires immediate thoracotomy.[14] Diagnosis of esophageal injury is difficult. Shefts and Doud [15] found that dysphagia was not a reliable symptom but that severe back pain radiating down into the lumbar region was a constant complaint and was unrelieved by administration of large doses of morphine. When this injury is suspected, the patient can be given a swallow of iodized oil before fluoroscopic study of the chest. The surgical approach should be either posterolateral transpleural or posterior mediastinotomy.

4. A flaccid chest wall due to multiple rib fractures, both anterior and posterior, keeps a patient in shock. One should treat a patient with this condition by strapping, placing him on the injured side, or traction on the rib fragments with towel clips and weights. When none of these methods is successful and the patient remains in shock, the chest should be opened and internal fixation attempted. Complete reexpansion of the lung by negative pressure from under water seal suction drainage will do much to stabilize the cardiorespiratory system.

NONOPERATIVE TREATMENT

Hemopneumothorax may develop after either penetrating or crushing chest injuries. A needle is inserted in the pleural cavity to aspirate blood and air from patients with this condition, and a monometric reading is taken. When the monometer shows that the intrapleural pressure is negative, the lacerations of the lung are sealed and the lung will expand. Repeated aspirations without air replacement are all that is needed. On the other hand, when the monometric reading is positive, the lacerations of the lung are not healed, and a tension pneumothorax has developed. Such a collapsed lung must be reexpanded as soon as possible by insertion of an intercostal catheter attached to under water seal suction.

Rib fractures are the most frequent chest injury. Strapping with adhesive tape has been a common treatment for this condition but should be condemned, because it limits chest expansion and prevents proper aeration. The best treatment is repeated injection of the intercostal nerves with procaine hydrochloride. This relieves the pain and permits normal chest excursions.

12. Betts, R. H., and Lees, W. M.: Military Thoracic Surgery in Forward Area, J. Thoracic Surg. **15**: 44-63 (Feb.) 1946.
13. Kinsella, T. J., and Johnsrud, L. W.: Traumatic Rupture of the Bronchus, J. Thoracic Surg. **16**: 571-583 (Oct.) 1947.
14. Scannell, J. G.: Rupture of the Bronchus Following Closed Injury to the Chest: Report of Case Treated by Immediate Thoracotomy and Repair, Ann. Surg. **133**: 127-130 (Jan.) 1951.
15. Shefts, L. M., and Doud, E. A.: Management of Thoracic and Thoracoabdominal Wounds in Forward Areas in Sicilian and Italian Campaigns, J. Thoracic Surg. **15**: 205-223 (June) 1946.

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Subcutaneous emphysema frequently develops in chest injuries and is generally not a serious complication. When pleural adhesions prevent a pneumothorax from forming, the subcutaneous emphysema may become extensive. In these severe conditions it is necessary to make multiple incisions where the air has collected, to allow the air to escape. Mediastinal emphysema may follow a crushing injury. This diagnosis is made by x-ray and observation of a peculiar crackling sound of the heart beats. Extensive mediastinal emphysema is relieved by superior mediastinotomy. In all cases of emphysema, antibiotics should be given.

LATE OPERATIONS FOR CHEST INJURIES

As we mentioned before, most patients with hemopneumothorax can be treated with repeated aspirations of the pleural cavity. In a few patients, immediate thoracotomy will be necessary because of massive hemorrhage. In a third group, clotting of the hemothorax occurs. Tuttle and his associates [16] placed the incidence of intrapleural clotting at 5% to 10% in civilian wounds and 15% to 20% in war wounds. According to Langston and Tuttle,[17] if clotting is to occur, it can usually be detected in three to five days after the injury. The detection of clotting is dependent on the surgeon's inability to aspirate blood from the chest when x-ray and physical examination indicate its presence. If clotted blood is allowed to remain in the pleural cavity without treatment, the lung will fail to reexpand, and in many cases chronic empyema will develop.

This clotted hemothorax can be treated in two ways. In the early stages 150,000 units of streptokinase and 60,000 units of streptodornase can be injected into the pleural cavity.[18] Twenty-four hours later the chest is aspirated. The treatment is repeated within a few days as often as it is effective. If the treatment is effective, the clot becomes liquefied and the lung will reexpand. The desired results are not accomplished in all patients. Furthermore, as more time has elapsed the treatment with streptocolysins is less liable to be successful. A contraindication to this treatment is the presence of a bronchopleural fistula, because of the danger of contralateral pneumonitis.

The other method of treatment is open thoracotomy with decortication. Decortication became popular during World War II. The operation consists of opening the chest and removing blood clots and then dissecting the organized peel from the pleural surface. At the completion of the operation, the lung is reexpanded and kept expanded with underwater seal suction drainage. Samson and his associates [19] stated that, from a purely technical point of view, decortication is best performed three to five weeks after injury. If it is performed less than two weeks after injury, the peel is thin and friable and the operation tedious because the poorly defined membrane must be removed piecemeal or painstakingly wiped from the pleural surface. When decortication is performed too late, probably after 10 to 14 weeks, the fibrous union between peel and pleura is often so firm that a proper cleavage plane cannot be established. Opinions vary as to whether it is necessary to remove the peel from the diaphragmatic and parietal pleura. We remove all of the peel if it is technically feasible.

Other late operations on the chest may be done for the removal of foreign bodies. Small metallic foreign bodies should not be routinely removed. However, irregularly shaped foreign bodies, foreign bodies over 1½ cm. in diameter, foreign bodies lying near important structures, and intraventricular foreign bodies should be removed by open thoracotomy as an elective procedure.

With present methods of treatment, empyema will develop in few patients after chest injuries. We have omitted detailed discussion of the treatment of empyema. However, in general, when a patient is very septic or has putrid empyema, drainage should be instituted at once. Other methods of treatment consist of the use of streptokinase and streptodornase [20] and decortication of the empyema cavity to accomplish reexpansion of the lung.

HOSPITAL CARE OF PATIENTS WITH THORACIC INJURIES

Patients with chest injuries, whether receiving surgical or nonoperative treatment, require careful supervision. Frequent blood pressure readings help in the detection of early shock, mediastinal shift, or tracheobronchial obstruction. Increase in the pulse rate is generally the first indication of beginning atelectasis, which should be treated vigorously. The patient should be encouraged to cough once an hour; expectorants, such as sodium iodide in doses of 1 gm. twice a day, should be administered, and catheter aspiration of the tracheobronchial tree or bronchoscopy should be done if the atelectasis persists.

Pulmonary edema or wet lung following trauma has been the subject of much discussion. Daniel and Cate,[21] in an experimental study, found that infusions of sodium chloride, hypoxia, and reflex phenomenon are all factors in the production of pulmonary edema. Prevention appears to depend on avoiding sodium chloride infusions, maintaining a clear airway, administering oxygen, and blocking nerves.

Oxygen is important in the management of chest injuries and should be administered according to a definite plan. Nasal oxygen is the method of choice, because more oxygen is delivered than with a tent and the nursing problem is simpler. Nasal oxygen must be kept moist by bubbling the gas through water, and the catheter should be removed and cleaned every three or four hours, to prevent crusted secretions from plugging it. Oxygen therapy should be discontinued if possible after 36 hours, because prolonged use of oxygen predisposes to atelectasis by decreasing respiratory excursions and by drying the secretions in the tracheobronchial tree.

16. Tuttle, W. M.; Langston, H. T., and Crowley, R. T.: The Treatment of Organizing Hemothorax by Pulmonary Decortication, J. Thoracic Surg. **16**: 117-126 (April) 1947.

17. Langston, H. T., and Tuttle, W. M.: The Pathology of Chronic Traumatic Hemothorax, J. Thoracic Surg. **16**: 99-116 (April) 1947.

18. Read, C. T., and Berry, F. B.: The Utilization of Streptokinase-Streptodornase in Patient with Hemopneumothorax and Patient with Postpneumonectomy Sanguineous Coagulum, J. Thoracic Surg. **20**: 384-392 (Sept.) 1950.

19. Samson, P. C.; Burford, T. H.; Brewer, L. A., III, and Burbank, B.: Management of War Wounds of the Chest in a Base Center: Role of Early Pulmonary Decortication, J. Thoracic Surg. **15**: 1-30 (Feb.) 1946.

20. Tillett, W. S.; Sherry S., and Read, C. T.: The Use of Streptokinase-Streptodornase in the Treatment of Chronic Empyema, with Interpretive Discussion of Enzymatic Actions in Field of Intrathoracic Diseases, J. Thoracic Surg. **21**:325-341 (April) 1951.

21. Daniel, R. A., Jr., and Cate, W. R., Jr.: "Wet Lung"—an Experimental Study: Effects of Trauma and Hypoxia: Neurogenic Factor, Ann. Surg. **127**: 836-857 (May) 1948.

CONCLUSIONS

Most patients with chest injuries will live if the patients are properly handled from the time the injury occurs. The importance of training ambulance and admitting room teams in first aid methods peculiar to chest injuries is stressed. The necessity of early operation in thoracoabdominal injuries is emphasized. The importance of a knowledge of the methods of maintaining a clear airway in all patients with chest injuries is fundamental. The observance of certain principles in cardiorespiratory function in patients with chest injuries will save many lives.

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ACUTE HEAD INJURY

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The subject of acute head injury is of ever increasing importance, paralleling the increasing tempo of our mechanical age. By all odds, the best treatment of acute head injury is preventive. Prevention implies constant and unrelenting effort to propagandize the dangers of high speed. The extent and severity of brain injury are determined at the moment of impact of the head against an unyielding object. Should the resultant force be relatively slight, the injury will be slight and the recovery, in all likelihood, prompt and devoid of sequelae. Should the impact on the head be severe, serious, perhaps irremediable, damage to the brain will result, or death may ensue. Hence, education designed to eliminate, as far as possible, the hazards of high speed life is important. But granted that injury has occurred, every physician must then face the immediate problem of attempting to lessen the resultant damage. Those who deal with such problems frequently can meet the situation with familiarity and relative ease. It is for the physician who sees such injuries infrequently and who is less often called on to analyze the problems involved that this paper is intended.

Any case of head injury involves one or more of four elements concerning the head proper. It is the physician's responsibility to analyze the immediate problem in relation to these various potentialities. The person who has sustained a head injury may be suffering from trauma of the scalp, from skull fracture, from one of the various forms of meningeal hemorrhage, or from injury to the brain, or he may be suffering from a combination of these injuries, with or without significant disturbance of the general physiology of his body.

Injuries to the scalp are obvious lesions, the recognition of which involves no particular complexity of thinking but whose seriousness may be overlooked if one fails to recognize the exsanguinating potentialities of extensive scalp injuries, a reflection of the abundant vascular supply of the scalp, or if one fails to consider seriously the protective function of the dermal layer and of the highly developed aponeurosis in relation to infection. Both of these sheet-like structures comprise effective barriers against infection of the deeper layers of the scalp. Space will not permit a detailed consideration of treatment of scalp injuries, but the importance of surgical cleanliness, of wide shaving of the scalp, and of the application of good general surgical principles is self-evident.

The second category of acute head injuries is that of skull fracture. Linear and comminuted fractures of the skull are of importance only when they tear major vascular channels, such as the middle meningeal artery or the larger venous sinuses, when they tear cranial nerves, or when they cause compounding of the wound, as when a linear fracture enters the frontal sinus or the ethmoid cells or opens the middle ear. Under these circumstances, infection may enter the intracranial cavity and give rise to meningitis or brain abscess. In general, the last group, with "hidden" compounding, requires the use of sulfonamides and antibiotics to prevent infection. Relatively little can be done for torn cranial nerves. Treatment in the first group depends on the active handling of the meningeal hemorrhage resulting from the tear of a particular vessel, a subject that will be discussed later.

Depressed fractures usually require elevation, which is more important when the depression is extensive or when it lies in relation to functionally important areas of the brain, such as the sensorimotor cortex or the speech mechanisms of the dominant hemisphere. Compound wounds associated with skull fractures must of course be handled with reference to general surgical principles. In this paper emphasis will be placed on the various forms of meningeal hemorrhage, since it is these forms of injury for which definitive therapy is most clearly evident and in which, if definitive therapy is neglected, the greatest damage will result.

There are three forms of meningeal hemorrhage, two of which, epidural and subdural hemorrhage, are of special importance. For all practical purposes, these two types of space occupying lesions may be regarded as essentially similar if certain qualifications are imposed at the onset. Accumulations of blood occur either on the outer or the inner side of the dura. The outer side of the dura is closely affixed to the undersurface of the skull, and it is in the outer layer of the dura that the meningeal vessels run. If, as a result of trauma, one of the meningeal vessels is torn, blood begins to accumulate in the epidural space. Accumulation may continue because the bleeding is under arterial pressure. Thus, the dura may be stripped from the undersurface of the skull, and, in a relatively short time, perhaps 15 to 30 minutes, a significant amount of blood may accumulate, the dura being stripped from the undersurface of the skull in a relatively restricted area. Such bleeding usually arises from the middle men-

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ingeal vessels, and, as a result, such clots usually lie in the temporoparietal region.

The second possibility of bleeding in relation to the dura is the subdural hematoma. The subdural space is a potential cavity that covers the entire convex surface of the hemisphere. Thus, blood that escapes into the subdural space results in a hematoma that is generally more extensive than the epidural hematoma, for there are no restraints against its spread over the hemisphere. The acute accumulation of blood in the subdural space may result either from the tearing of superficial vessels, arterial or venous, as they traverse the cortex or from the tearing of major venous channels leaving the surface of the brain and entering the large dural sinuses. These thin-walled vessels, draining the surface of the brain, must, to reach the sinuses, traverse the subdural space, and, being fixed at their points of entry into the sinuses, although free over the cortex to move with the brain, they may readily be torn if a movement of the brain within the skull case is of undue proportion.

The brain has a remarkable capacity to adjust itself to space occupying lesions, provided these lesions develop slowly; however, adjustments that must be made in 15 minutes, a half hour, or an hour are not well tolerated by the brain. Not only is the brain shifted unduly by the hemorrhage, but, under such circumstances, there are secondary circulatory disturbances occurring in the portion of the brain underlying the hematoma, which lead to swelling of the underlying hemisphere. This compounds the difficulty further, and, if the clot is not evacuated, serious sequelae and even death may result.

The physician may recognize such accumulations, with their impending threat to normal function and survival by the following symptoms and signs. In most instances, there will be signs of injury about the head, even though the patient may not be able to provide historical data, as it is possible that the initial injury may cause protracted unconsciousness. In some instances, however, consciousness may be recovered after the blow. Drowsiness and progressively deepening coma after a head injury are always signs of grave significance. Then, since epidural clots are almost always unilateral and acute subdural clots are frequently unilateral, there may be evidence of dysfunction of the underlying hemisphere, manifested by unilateral paresis, which proceeds to paralysis.

The shift of the brain stem, which is an extremely important accompaniment of the space consuming action of the clot, may produce signs of pupillary inequality, usually produces dilatation on the side of the lesion, and sometimes produces signs of midbrain disturbance, characterized by decerebrate rigidity, generally coming on in waves and frequently precipitated by external stimuli, such as handling of the extremities by the examiner.

An excessive amount of blood may accumulate within a fraction of an hour, or an hour or two; thus, if the bleeding is rapid and massive, the physician must be prepared to make sure that the offending clot is removed at the earliest opportunity. Disturbance of function develops most frequently within a few hours or less in the case of epidural hematomas, and irreparable damage results if the condition is not recognized and treatment is not promptly instituted.

Sometimes, subdural accumulations of blood develop less rapidly and are less extensive if tamponade closes the venous channels relatively early. Such clots are tolerated during the acute period following the injury and manifest themselves only days, weeks, or even months later. The subacute and chronic subdural hematomas are problems that cannot be discussed within the limits of this paper.

The third type of meningeal bleeding, subarachnoid hemorrhage, may be discussed briefly, since it is not of surgical importance. The subarachnoid space is, from the surgical point of view, inaccessible, and, in any event, surgical drainage is not valuable because the reticuloendothelial lining of these spaces provides hosts of phagocytes that are readily mobilized during hemorrhage and which, in the course of days, dispose of the extravasated blood in a more efficient manner than has been conceived of surgically.

The fourth general category of head injuries, brain injury per se, cannot be extensively treated in this paper. One should, however, point out certain basic principles. The disturbance of brain function resulting from direct transmission of force to the brain presumably represents a physical disruption of the structural and, therefore, the conducting integrity of the nerve cells; or it may represent a secondary effect, dependent on disturbances of circulation resulting from the transmission of lines of force to the blood vessel walls, with the production of vasoparesis, with its associated nutritional disturbances and, therefore, disturbances of conduction. In either event, the degree of disturbance of normal brain function depends on the extent and the severity of interference with normal conduction.

Interference with consciousness is immediate or delayed. Sufficiently sudden acceleration or deceleration of the head results in sudden loss of consciousness. In this instance, it seems that nerve cell conduction is immediately and profoundly disturbed in those centers subserving the waking state, centers that physiological studies suggest lie at the midbrain and upper brain stem levels. It seems logical to concur in the generally accepted hypothesis that such dysfunction is the result of a disruption of the physical integrity of the nerve cells, a disruption from which recovery usually takes place quickly, in seconds or minutes. Other brain stem mechanisms may be concurrently disturbed; thus, vomiting, dizziness, and pulse and blood pressure alterations may be manifested early in persons who have had this form of transient loss of consciousness, to which the term concussion properly applies.

A second form of immediate loss of consciousness is that which occurs in injuries in which the head may not be directly involved. Grave general bodily injury, such as fracture of the femur, is often associated with immediate and transitory loss of consciousness. In this instance, it seems likely that a sudden influx, in a massive quantity, of afferent impulses from the periphery is delivered to the centers of consciousness, disrupting their function.

A third possible mechanism is that in which physical injury, either direct and immediate, as in brain stem contusion, or indirect and delayed, as in secondary brain stem hemorrhage, impairs function.

Finally, the fourth mechanism is delayed and is dependent on increased intracranial pressure. As the result of studies of head injury carried out for the Army, I have concluded that the importance of this mechanism has been grossly overrated. Continuous records of patients whose pressure-volume relationships have been studied demonstrated conclusively that pressures as high as 1,400 mm. of water, induced by the addition of fluid to either the lumbar subarachnoid or the ventricular spaces, and well above those commonly associated with head injury, are not accompanied by alterations in consciousness. The final step in the demonstration, raising the pressure to heights exceeding the diastolic pressure, has, for obvious reasons, not been done on human beings, but clinical experience clearly indicates that, at such critical levels, consciousness will be lost, presumably because of ischemia of the centers subserving consciousness. Conceivably, there are instances in which such pressure becomes of clinical significance, but these instances, if existent, must be relatitvely rare and are not of general importance.

Other forms of acute brain injury fall into the category of cerebral edema and of contusion, laceration, and intracerebral hematoma formation. The clinical importance of edema, other than that which develops under meningeal clots, seems to me to be doubtful. It might produce disturbance, either through pressure, local or generalized, or through interference with conduction. I do not believe that it produces general increases in pressure of a degree sufficient to be significant. Edema may, however, be important when it contributes to a shift of midbrain structures, as, for example, when it develops beneath an acute epidural hematoma. Whether edema of a vital area such as the midbrain is of itself a significant deterent to conduction and, therefore, to proper function or whether it merely signals a more basic physiological disturbance that produces a conduction deficit has not been determined.

With the exception of intracerebral hematomas, the treatment of brain injuries in the light of present knowledge involves the sustaining care that is applicable to all forms of injury, care that is designed to protect general bodily function: the establishment and maintenance of an adequate airway, by tracheotomy, if necessary; the rectification of surgical shock, if present; the correction of hyperthemia, with its excessive demand for oxygen; the maintenance of an adequate fluid and caloric intake; attention to bladder and bowel; prevention and elimination of infection; and rest and quiet, achieved, if necessary, through the judicious use of sedatives. Finally, as recovery ensues, the physician has the responsibility of providing reassurance and supervising rehabilitation. Analysis of repeated electroencephalographic tracings may aid in assessing prognosis.

In discussing brain injury per se, special attention must be devoted to the handling of intracerebral hematomas, which may result from tearing vessels within the cerebral substance, from rupture of preexistent vascular anomalies, and, probably, also from the coalescence of multiple petechial hemorrhages. When such clots are sizable, their surgical removal is imperative. How are they to be recognized? Since they act as other space occupying lesions the clinical picture is often little different from that presented by epidural and subdural hemorrhage. Hence, deepening levels of unconsciousness, hemiparesis, pupillary alterations, and signs of midbrain dysfunction may, one or all, be manifestations of intracerebral bleeding.

From the practical point of view, I believe that the complete investigation of any case of suspected hematoma formation—epidural, subdural, or intracerebral—necessitates multiple exploratory openings in search of meningeal hemorrhage. When a satisfactory explanation of the clinical condition is not found on exploration of the epidural and subdural spaces, one should proceed to investigate, through angiography or ventriculography, or both, the possibility of intracerebral hematoma formation. In my opinion, it is only in this way that the patient is studied completely and the possibility of adequate surgical handling is achieved. Should the studies reveal no clot, the treatment consists of the supporting measures outlined above.

SUMMARY

The physician's responsibility is to analyze the multiform and complex problem presented by the patient suffering from head injury, and, from his analysis, decide which of the many factors cited above are operating in the individual case. After such artificial fractionation of the problem, a synthesis must be made that will direct therapy. Surgical possibilities for the treatment of scalp injuries, certain types of skull fractures, and the evacuation of possible intracranial hematomas must be seriously weighed and investigated with the aid, if necessary, of ventriculography and angiography, and prompt and accurate evacuation must be performed when indicated.

In treating the remaining types of brain injury, general supportive measures are to be instituted as outlined above. Except as an indication of disturbed physiological processes, increased intracranial pressure is not, in my opinion, of grave moment and does not, of itself, constitute a therapeutic indication. There is need for a better understanding of the disturbed metabolism of nerve cells secondary to injury, so that a more rational treatment of such disturbed metabolism may be developed.

Economic Effects of Malaria.—The effect of malaria on a community may mean anything from a slight inconvenience to an almost complete cessation of individual and community activities. In the milder degrees of malarial endemicity the chief effect will be in the form of days lost to all beneficial activities on account of illness among the workers. This effect may be much greater than would be expected from the number of days lost, especially in tropical communities where as Macdonald has pointed out, the success or otherwise of agricultural operations often depends on the climatic conditions obtaining during a limited part of the year, generally that part when ploughing and sowing are carried out. If the sickness among the population coincides with this period the days lost and the impaired physical condition of the workers will have an effect on their productive capacity the results of which will endure throughout the remainder of the year in a way which would not have been the case had the malaria been prevalent at a less important part of the annual work cycle.—H. E. Shortt, M.D., The Impact of Protozoa on World Economic Problems, *British Medical Journal*, Nov. 10, 1951.

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ABNORMAL VAGINAL BLEEDING

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Cancer of the genitalia kills more women than any other type of cancer. The mortality rate from cancer of the uterus alone is 12.7 per 100,000 population, a loss of 20,000 lives in the United States. The general practitioner is the first to see the majority of cancer patients. Early diagnosis of carcinoma might result in the prevention of 75% of these 20,000 cancer deaths. Cancer of the genitalia is manifested early, in the majority of patients, by abnormal vaginal bleeding. If physicians follow a few routine steps, they are unlikely to gloss over early carcinoma of the uterus as a mere menopausal symptom. The purpose of this paper is to offer a simplified outline of procedure that will enable physicians to reduce materially the ravages of carcinoma of the uterus.

There are many lesions, other than carcinoma, that are manifested by abnormal vaginal bleeding. Blood dyscrasias, vitamin deficiencies, ovarian cystomas, organic heart disease, and many other pathological processes make their first appearance with a change in the menstrual pattern. The change in the flow is characterized by menorrhagia, metrorrhagia, amenorrhea, or oligomenorrhea. For the most part, this paper will be confined to the more serious indications of disease, menorrhagia and metrorrhagia.

This paper will principally concern clinical problems. All specialists have an intense interest in this problem, but the general practitioner is the most important link in obtaining an early, correct, and complete diagnosis. A general discussion of some of the commoner causes of organic and functional disorders will be made, with particular emphasis on division into age groups. The most likely causes of bleeding at each particular period will be discussed.

To cause bleeding, organic disease can be benign or malignant, local or general. The general bodily disturbances can be dismissed with the thought that there are other than local causes for profuse menstruation. Functional uterine bleeding is typically exemplified by those menstrual disorders that occur in adolescence and at the menopause. If a definite organic or endocrine cause cannot be found, the bleeding is functional. Unfortunately, this category is too large. The list of medicaments used in remedying functional disorders is also too large and encompasses almost everything in the pharmacopeia. The connotation of excessive bleeding is entirely different in the adolescent than it is in the postmenopausal woman. From birth to puberty or the menarche, there are few instances of vaginal bleeding. A carry-over of estrogens from the maternal organism will cause vaginal bleeding and enlargement of the breasts in some female babies. In the older child, foreign bodies in the vagina are often offenders. Novak,[1] among others, has described precocious puberty in the young girl. These children, who range from 6 to 12 years of age, become young ladies in appearance and mental status and, occasionally, menstruate functionally, ovulate, and reproduce.

From the menarche to the reproductive period, there are frequent menstrual disorders of an inconsequential nature; anemia, hypothyroidism, blood dyscrasias, avitaminosis, and inadequate diet are often the responsible factors. Small doses of thyroid and other supportive therapy usually remedy this condition. Occasionally, repeated dilatation and curettage, transfusions, and even hysterectomy are required as a life-saving measure.

In the reproductive age group, there are more instances of hormonal imbalance and organic diseases that cause abnormal bleeding. The complications of pregnancy are among the commonest. Cervical polyps, endometriosis, eroded lacerated cervices, infection (tubal, vaginal, or cervical), uterine fibromyomas, and broad ligament varicosities are noted. Endocrine dysfunctions are found in conjunction with disturbed relationships in the pituitary, thyroid, or ovarian endometrial pattern; this results in anovulatory bleeding, incomplete shedding of the endometrium, and endometrial hyperplasia.

In the late reproductive or premenopausal age group, the incidence of carcinoma of the cervix begins to rise. In treating women in this group, the physician must develop a cancer consciousness that will enable him to discover early, curable lesions. An early cancer cannot always be palpated with the gloved finger or seen with the naked eye. During the menopause, there is a continuation of most of the above-mentioned conditions, with the addition of functional bleeding disorders. Menstrual abnormalities and irregular bleeding are not natural during the menopause. Accurate diagnostic studies must be made to determine the cause of the bleeding.

After the menopause, the increasing incidence of malignant growths becomes overwhelming. The early malignant growth, which, according to recent studies, probably goes undetected for many years, at this time becomes more evident, easier to diagnose, and more difficult to treat successfully. The incidence of malignant growths in the postmenopausal years, as signified by vaginal bleeding, varies from 25% to 75% of all patients, depending on the clinic reporting. The true figure is probably between 40 and 50%. Some of the commoner benign causes are polyps, fibromyomas, senile vaginitis, urethral prolapse and caruncle ovarian cystomas, and atrophic cystic endometriums.

The results of my study of 227 clinical histories are given in the table. Unless the cause of bleeding was either organic or endocrine, the patients, including those with pregnancy complications were listed under the functional heading. These charts were reviewed at the California Hospital and from clinical practice over a period of three years. The age variation is from a few days to 91 years.

There is a definite preponderance of functional uterine bleeders. The term is not satisfactory, but there is no better way to group those patients who bleed for no apparent reason. Psychogenic factors are responsible for more functional bleeding than most physicians realize.

In the reproductive age group, functional uterine bleeding still occurs most commonly. Pregnancy and its

Read at the Fifth Annual Clinical Session of the American Medical Association, Los Angeles, December 5, 1951.

1. Novak, E.: Gynecological and Obstetrical Pathology with Clinical and Endocrine Relations, ed. 2, Philadelphia, W. B. Saunders Company, 1947, pp. 406-407.

complications were the second most likely diagnosis, and this was followed by uterine fibromyomas, cervical disease, and endometriosis. In the menopausal group, organic disease was the most prevalent; this was closely followed by functional bleeding. The misuse of estrogens caused almost as many abnormal bleeding problems. The postmenopausal age group was comprised of those patients in whom there had not been a regular period for at least one year. Malignant growths were found on 38% of this group. The misuse of estrogens caused considerable tension and necessitated complete studies with dilatation and curettage and biopsy to determine the true cause of the bleeding.

Therapy for those patients with abnormal genital bleeding varies from watchful waiting to total hysterectomy and bilateral salpingo-oophorectomy. When there are multitudes of "sure cures" for a medical entity, there is usually no one completely satisfactory method. The following simple outline of treatment is suggested.

A complete physical examination should be made, with a complete blood cell count and a determination of the bleeding and clotting time. A meticulous local examination of the vulva, vagina, cervix, and uterus is mandatory. No pelvic examination is complete until the cervix is visualized through a speculum, in good light.

TABLE 1.—*Causes of Vaginal Bleeding in 227 Cases*

Age Group	Functional	Organic	Endocrine
Birth to puberty	1	1	2
Adolescence	23	2	4
Reproductive	59	31	11
Menopausal	17	18	13
Postmenopausal	14	17	14
	114	69	44

Determination of the basal metabolic rate, blood iodides, and other pertinent laboratory work is often helpful.

Endocrine therapy is effective in treating the majority of cases of the nonorganic bleeding; one of the most reliable of these glandular products is thyroid. In the adolescent, and often during the reproductive period, small doses of thyroid will regulate the menstrual cycles. Pituitary extracts and anterior pituitary-like hormones are used. The three commonest endocrines in use today are progesterone, estrogen, and testosterone propionate with its esters. Large doses of estrogens have been the favorite means of controlling nonorganic bleeding. Oral estrogens such as diethylstilbestrol may cause nausea and vomiting; however, this medication can be injected, or other less toxic estrogens for oral administration, such as premarin® (estrogens derived from pregnant mares' urine) or ethinyl estradiol, may be used. Once the bleeding has stopped, cyclic therapy, as advocated by Hamblen,[2] may be instituted to regulate the periods.

Testosterone propionate has given good results. The initial dose, usually 25 to 50 mg., may be given subcutaneously, and oral linguets® (tablets to be dissolved sublingually), 10 mg., may be started at the same time. The dosage is gradually reduced as the bleeding is controlled. To avoid masculinization effects, more than 300 mg. a month should not be given. Progesterone is said to create a "nonsurgical curettage," and a bleeding period usually follows withdrawal of the hormone. The dosage schedule varies with the individual, and the medication can be given orally or by injection. From the standpoint of economy, ease of administration, and rapidity and certainty of action, many gynecologists have found that estrogens and male hormones are most effective; results with progesterone have been uncertain and expensive. While one is stopping the flow of blood, supportive therapy, in the form of iron, vitamin B complex, and a high protein diet, should be carried out. Probably most important, the physician should assuage the patient's fears, for nothing is more frightening to a woman than the unimpeded, gushing flow that is not at the expected period.

Too often, hormones and other "shot treatments" are employed and an early malignant growth is overlooked. Razor-sharp judgment must be exercised. In case of doubt, a surgical specimen, obtained by curetting the endometrium or a biopsy from the cervix or vulva may save a patient's life. Relatively minor surgery, in the form of dilatation and curettage or multiple biopsies, should be performed early and routinely in doubtful cases. To depend on one's clinical judgment or experience in uncertain cases invites disaster, for only the trained pathologist can make the diagnosis from a surgical specimen. It is rarely necessary to resort to hysterectomy to control heavy vaginal bleeding. Radiation therapy to control uterine bleeding has been used only rarely. The long list of contraindications, the possible masking of early cancer, as outlined by Corscaden and associates [3] has resulted in the employment of other methods of control.

Each year, in the United States, approximately 15,000 woman die of cancer of the uterus unnecessarily. One-third of all women dying of cancer die of carcinoma of the uterus, and carcinoma of the cervix is responsible for 85% of the deaths of women dying of cancer of the uterus. The responsibility for this needless mortality lies primarily with the patients and secondarily with the medical profession. Numerous benevolent agencies are conducting campaigns to educate the lay public to the dangers of abnormal vaginal bleeding. We should encourage this education outline and aid it whenever possible. Secondly, we should train ourselves to suspect carcinoma in every patient. Attempts, by every means possible, should be made to detect it, and, once it is discovered, the patient should be assured of early, well-organized therapy by those trained in this field. Most gynecologists refer these patients to cancer treatment centers. Carcinoma of the cervix is primarily a disease of the late reproductive age group (35 to 55 years). Carcinoma of the fundus, rarely occurring before the age of 40, usually occurs between 50 and 60, the average age being about 57. Carcinoma of the vulva and ovary occurs later, but earlier lesions such as leukoplakia may be precursors of later vulvar cancer.

The mortality tables of carcinoma of the genitalia vary with two factors, the clinical stage and the histological type. The clinical stage is the more important factor, especially in carcinoma of the cervix, as is shown by Costolow and Nolan.[4] The mortality rate for cancer of the

2. Hamblen, E. C.; Cuyler, W. K.; Pattee, C. J., and Axelson, G. J.: Endocrine Therapy of Functional Menometrorrhagia and Ovarian Sterility: Oral Use of Anhydro-Hydroxy-Progesterone and Estrogens, J. Clin. Endocrinol. **1**: 221, 1941.

3. Corscaden, J. A.; Fretig, J. W., and Gusberg, S. B.: Carcinoma Subsequent to the Radiotherapeutic Menopause, Am. J. Obst. & Gynec. **51**: 1, 1946. Corscaden, J. A.: Gynecologic Cancer, New York, Thos. Nelson & Sons, 1951, p. 226.

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cervix may vary from 10% in stage 1 lesions (those confined to the cervix) to 100% (those with distant metastases). Every carcinoma of the uterus probably goes through an early preinvasion stage, during which complete cure is almost assured. In considering cancer of the cervix, the usual ratio of the stage at which it is seen by the examining physician is 15% at stage 1, 35% at stage 2, 35% at stage 3, and 15% at stage 4. Whereas the cure rate in stage 1 is 70 to 75%, it falls to almost 0 in stage 4. By recognizing even the earlier preclinical carcinomas in situ, we can further increase the cure rate and prevent some of the 15,000 needless deaths.

Prevention of carcinoma of the uterus would be ideal if we could attain this goal. Because of the efforts of many conscientious workers, there are many ways in which carcinoma of the uterus can be kept from progressing to an incurable stage. Routine pelvic examination of all women, at least every six months, would aid tremendously. A careful speculum examination, with multiple biopsy, cervical coning, and smears, should be routine.

Multiparity is probably conducive to cancer of the cervix. An extensive study of Catholic nuns showed an almost complete absence of cancer of the cervix. At the delivery of a baby, routine inspection and careful repair of the cervix, as advocated by Tollefson,[5] would reduce the incidence of chronic, infected, cancer producing cervices.

Cashman [6] has shown the wisdom of conization and cauterization of the cervix in preventing cancer. Severely infected, lacerated cervices should be treated in this way at an early stage. If a subtotal hysterectomy rather than total hysterectomy must be performed, the surgeon may save a life by coning out the cervical stump with a Hyams type conization cutting cautery.

Early detection by the physician starts with the taking a good history. About 85% of all patients with cancer of the uterus bleed abnormally from the vagina. Any abnormal discharge or bleeding, especially contact bleeding in a multiparous patient of cancer age, should cause suspicion of a malignant growth in the cervix. An obese, hirsute, hypertensive, bleeding, nulliparous, diabetic woman, with a late menopause, should lead one to suspect cancer of the endometrium of the uterus, particularly if she has had earlier radiation to control excessive uterine bleeding. Postmenopausal endometrial polyps, as well as persistent endometrial hyperplasia are thought by many to predispose to later carcinomatous changes.

Cervical and endometrial biopsies are simple procedures. A multiple punch biopsy, one specimen from each quadrant at the squamocolumnar junction, is a five minute office procedure that any practicing physician can perform. Any cervix abnormal enough to require treatment should be subjected to biopsy. Suction curettage can be done in the office, but it is preferable for a thorough dilatation and curettage to be done in the hospital, in order to rule out carcinoma of the endometrium. Costolow and Nolan [4] have devised a cervical coning biopsy curet that removes a strip of tissue from the squamocolumnar junction of the cervix. Papanicolaou and Traut [7] have investigated the possibility of cytological diagnosis of early carcinomas. Considerable controversy has evolved about this latest discovery in cancer detection, but one must accept every diagnostic aid in early neoplastic discovery. The consensus seems to be that the method is a good screening process in the hands of trained vaginal cytologists.

In a review of 187 patients with cancer of the uterus who were admitted to the California Hospital over a period from 1946 through 1951, it was found that there was an average delay in seeking treating of 5.2 months by the patient and that this was followed by another period of 5.4 months procrastination by the physician. Thus, there was a total delay of 10.6 months. Patients with cancer of the cervix delayed longer than those with cancer of the corpus (5.6 months as compared to 4.7 months), whereas the physician delay was about the same for the two types of cases (5.2 and 5.7 months respectively). Questionable therapy was carried out in 36 (41%) of the endometrial cancer patients and in 18 (17%) of the cervical cancer group. Fortunately, there is a well-organized tumor group in close relationship to the California Hospital that ensures early, complete, and correct treatment to each patient under its care.

Subtotal hysterectomy was performed on many patients with cancer of the endometrium and a few patients with cancer of the cervix, in this series. Cervical amputations were done on patients with stage 3 carcinomas of the cervix. It is still correct to treat cancer of the endometrium by instilling radium into the uterus; this is followed, in four to six weeks, by total hysterectomy and bilateral salpingo-oophorectomy. Cancer of the cervix is still best treated by irradiation in experienced hands. New surgical techniques must stand the trial of time and general usage.

Howson and Montgomery [8] showed that the failure of the physician to examine the patient with genital cancer was responsible for over 50% of the delayed diagnosis. When the examination was made, the next most frequent cause of delay was a wrong diagnosis. Hypodermics and oral medication were prescribed for many patients. The performance of inadequate surgery before cancer had been ruled out by appropriate study is a cause of much needless mortality.

SUMMARY

An endeavor has been made to simplify the medical care of patients with abnormal vaginal bleeding. An early, complete, and correct diagnosis is essential. Every patient should be examined thoroughly under proper conditions. Multiple biopsy of any questionable cervical or vulvar lesion and curettage in patients with endometrial bleeding problems should be routine. Early referral to cancer treatment centers concludes the general practitioner's responsibility. Endocrine treatment can be instituted in patients with benign bleeding. Estrogens and male hormone are effective.

511 S. Bonnie Brae St.

4. Costolow, W. E., and Nolan, J.: Factors Influencing Prognosis in Treatment of Carcinoma of Cervix Uteri, J. Obst. & Gynec. **61**: 548, 1951.

5. Tollefson, D. G.: Immediate Attention to the Postpartum Cervix, West. J. Surg. **56**: 285, 1948.

6. Cashman, B. Z.: Role of Deep Cauterization in Prevention of Cancer of the Cervix: Report of 10,000 Cases, Am. J. Obst. & Gynec. **41**: 216, 1941.

7. Papanicolaou, G. N., and Traut, H. F.: Diagnosis of Uterine Cancer by the Vaginal Smear, New York, Commonwealth Fund, Division of Publications, 1943.

8. Howson, J. Y., and Montgomery, T. L.: Attack or Delay Period in Diagnosis of Pelvic Cancer, with Further Observation of Philadelphia Study, Am. J. Obst. & Gynec. **57**: 1098, 1949.

MATERNAL MORTALITY IN DOWNSTATE ILLINOIS FROM 1948 TO 1950

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Prior to January, 1948, data concerning maternal deaths in downstate Illinois (the state exclusive of the Chicago area) consisted only of the limited information given on death certificates. This information was found deficient in omitting significant conditions, in failing to differentiate obstetric and nonobstetric causes, and in obscuring the proper obstetric entity. A plan was formulated in August, 1947, to overcome these deficiencies, to gather more complete factual data, to assess factors of preventability and responsibility, and through such measures to effect a general betterment of maternal care. This plan, under the joint auspices of the Bureau of Maternal and Child Health of the Illinois Department of Public Health and the Maternal Welfare Committee of the Illinois State Medical Society, called for the study of deaths associated with gestation in downstate hospitals by three main steps: one, the visit of the bureau's consultant in maternity to the hospital or the doctor's office for careful notes of all available records and for personal interview with the attending physician; two, a complete and anonymous reporting of the data; three, a later review and audit of these reports by the committee. The method of procedure and various necessary forms were approved by the council of the state medical society and by the regional medical director of the United States Children's Bureau. The program went into effect on Jan. 1, 1948.

This presentation summarizes the findings for the first three years of the study, 1948 through 1950. During this period there were 323,454 births in the downstate area, in 175 hospitals and in homes. Table 1 shows the number of live births and fetal deaths in hospitals and in homes for each year. The percentage of births in hospitals increased from 92.9% in 1948 to 94.6% in 1949 and 95.7% in 1950.

Table 2 shows that there were 237 maternal deaths in 318,256 live births, a maternal mortality rate for the three years of 0.74 per 1,000 live births. The rate shows a decrease from 0.87 in 1948 to 0.61 in 1950. The rate of 0.75 for 1949 compares favorably with the 1949 rate of 0.93 for the United States, based on the sixth revision of the International Lists of Diseases and Causes of Death.[1]

During 1948 the study was limited, in accord with the procedures originally adopted, to the downstate hospitals that provided maternity service. After January, 1949, it was broadened to include deaths associated with gestation in the entire downstate area regardless of place of occurrence. The 12 maternal deaths in 1948 that occurred outside of hospital maternity divisions were taken from death certificates and were not studied in detail. They were, however, considered in the computation of the mortality rate in table 2 and in the listing of causes of death in table 5.

During the three year period, detailed studies were made of 321 deaths; of these, 96 were held to be due to nonobstetric conditions, and 225 were charged to obstetric causes. All subsequent tables deal with the data assembled in the study of these 225 cases. The age of the patients ranged from 16 to 46 years; 41.3% were 21 to 30 years of age and 41.1% were 31 to 40 years of age. Deaths of white women accounted for 93.8% of the total and of nonwhite women for 6.2%. Of the 225 women, 211 (93.8%) were married; 11 (4.9%) were unmarried; 2 (0.9%) were widows; and 1 (0.4%) was divorced. Seventy-four women (32.9%) were in their first pregnancy; 151 (67.1%) were multiparas. Of these 151 multiparas, 108 died during a 2d to a 5th pregnancy, and 43 died during a 6th to a 17th pregnancy.

TABLE 1.—*Births in Downstate Illinois in Hospitals and Homes*

	Births in Hospitals			Births in Homes			Total		
	Live Births	Fetal * Deaths	Total	Live Births	Fetal * Deaths	Total	Live Births	Fetal * Deaths	Total
1948	96,594	1,526	98,120	7,183	271	7,454	103,777	1,797	105,574
1949	101,338	1,516	102,854	5,677	200	5,877	107,015	1,716	108,731
1950	102,900	1,518	104,418	4,564	167	4,731	107,464	1,685	109,149
	300,832	4,560	305,392	17,424	638	18,062	318,256	5,198	323,454

* Fetuses advanced to 20th week of uterogestation.

During the first trimester there were 27 deaths (12%), owing primarily to sepsis following attempts at criminal abortion and to hemorrhage from extrauterine pregnancy. Twelve deaths (5.3%) occurred during the second trimester. During the last three months of gestation, there were 185 deaths (82.2%), owing to the toll claimed by the late hemorrhages and the toxemias. In one instance (0.5%) there was no mention of length of gestation.

Twenty-eight mothers (12.5%) died before delivery, and 169 women (75.1%) died after delivery. There were 16 losses (7.1%) attributed to abortion and 12 (5.3%) due to ectopic pregnancy. Of the 28 undelivered women, 11 were delivered post mortem: 9 by cesarean section, 1 by forceps, and 1 by breech extraction. Including three sets of twins, there were eight liveborn and six stillborn infants. Of the eight liveborn infants, three died neonatally. The length of time before death following ad-

From the Bureau of Maternal and Child Health, Illinois Department of Public Health.

Read before the Section on Obstetrics and Gynecology at the One-Hundredth Annual Session of the American Medical Association, Atlantic City, June 15, 1951.

1. Dickinson, F. G., and Welker, E. L.: Maternal Mortality in the United States in 1949, J. A. M. A. **144**: 1395 (Dec. 16) 1950.

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mission to a hospital ranged from five minutes to three months. Of 211 such deaths, 99 (46.9%) occurred within 24 hours after admission, with an average admission to death time of 11 hours 20 minutes. The period till death following delivery also ranged from a few minutes to about three months. Of 169 postpartum deaths, 88 (52.1%) occurred within 24 hours after delivery, with an average delivery to death time of seven hours.

Three factors should be observed in table 3: first, the high percentage of operative deliveries among mothers who died; of 169 postpartum deaths, 117 (69.2%) occurred in cases in which there was some form of operative intervention. This is more than double the percentage of operative cases among all parturients in the state. The second noteworthy observation is the predominance of cesarean sections in this group; cesarean sections were done in 43.2% of these cases as compared with an overall state average of 3.7%. The third factor is that the classic cesarean procedure was done about three times oftener than the low cervical section. In regard to the first observation, it is to be expected that the operative incidence would be higher in a group of fatal cases because of the more frequent presence of complications. Careful review by the committee, however, has

TABLE 2.—*Maternal Mortality in Downstate Illinois*

	Live Births	Maternal Deaths			Maternal Mortality per 1,000 Live Births
		Hospital	Home	Total	
1948	103,777	79	12*	91	0.87
1949	107,015	70	10	80	0.75
1950	107,464	58	8	66	0.61
1948-50	318,256	207	30	237	0.74

* Not studied.

shown that in a number of these postoperative deaths there were no clear-cut reasons for interference.

The responsibility for the classification of deaths rests with the department's bureau of statistics. In 1948 the bureau followed the classification of the fifth revision of the International List of Causes of Death; in 1949 and 1950 it coded causes on the basis of both the fifth and the new sixth revisions. In its decisions as to coding, the bureau relies on the stated cause certified by the physician, the information obtained by the consultant on his personal interview, and the opinion of the committee following its thorough analysis of the protocols. In the event the committee and the bureau have differing opinions, the case is reviewed by the bureau and, if necessary, is referred by it to the National Office of Vital Statistics for final decision.

The study has sharply focused attention on the limited value of deductions—statistical or scientific—when causes of death are considered only on the basis of the statement on the certificate. Inaccuracies in certification have been found in 45 (14%) of the 321 cases studied. It matters not whether these inaccuracies are due to limited medical information, inadequate clinical examination, personal interpretation of definitions, or deliberate alteration of facts; the results lead to errors in obstetric thinking and in worth-while efforts to meet the challenge of the more important causes of death of mothers. It is encouraging to find that the number of cases in which a more accurate cause of death was determined as a result of the study dropped from 25 (23.6%) of the 106 cases investigated in 1948 and 14 (11.9%) of the 118 cases in 1949 to 6 (6.2%) of the 97 cases in 1950. The changes brought about in these 45 instances were

TABLE 3.—*Types of Delivery Associated with Maternal Deaths*

	1948	1949	1950	Total, 1948 to 1950	Percentage of Total
Spontaneous	14	24	14	52	30.8
Operative	40	40	37	117	69.2
Types of Operations					
Forceps	12	9	11	32	18.9
Low	9	5	7		
Mid	1	4	2		
High	2	..	2		
Cesarean Section	24	28	21	73	43.2
Classic	17	29	15		
Low	6	6	6		
Porro	1	2	..		
Extraction	2	1	3	6	3.5
Version & Extraction	2	..	1	3	1.8
Multiple operations	..	2	1	3	1.8

TABLE 4.—*Errors in Certification of Causes of Death*

	No. of Cases	Errors	
		No.	Percentage
1948	106	25	23.6
1949	118	14	11.9
1950	97	6	6.2
Total	321	45	14.0

12 changed from maternal to nonmaternal causes, 11 from nonmaternal to maternal, and 22 from one maternal cause to another.

Table 5 lists the number of deaths by causes. For the three year period hemorrhage was responsible for death

TABLE 5.—*Causes of Maternal Deaths*

	1948*	1949	1950	Total, 1948 to 1950	Percentage of Total
Hemorrhage	33	27	24	84	35.5
Antepartum	11	16	14	41	
Postpartum	14	9	6	29	
Abortion	1	1	1	3	
Ectopic	7	1	3	11	
Toxemia	19	23	19	61	25.7
Preeclampsia	3	5	4	12	
Eclampsia	12	14	14	40	
Other	4	4	1	9	
Infection	17	9	5	31	13.1
Puerperal	10	4	3	17	
Abortion	7	5	2	14	
Other	22	21	18	61	25.7
Embolism	7	15	10	32	
Anesthesia	3	2	7	12	
Pulmonary edema	2	..	..	2	
Heart failure	5	..	..	5	
Shock	2	1	..	3	
Ileus	1	..	..	1	
Cerebral hemorrhage	1	1	..	2	
Sulfonamide crystallization	..	1	..	1	
Intravenous administration of gelatin (?)	..	1	..	1	
Puerperal psychosis	1	..	..	1	
Incompatible blood	..	..	1	1	
Totals	91	80	66	237	100.0

* Including 12 home deaths not studied.

in 35.5%, toxemia in 25.7%, and infection in 13.1%. This gives a total for this triad of 74.3%. The remaining 25.7% of deaths were due to various conditions, including 32 deaths (13.5%) caused by embolism, and 12 deaths (5.1%) caused by anesthesia.

The infant is inevitably endangered by the circumstances associated with the death of the mother. Table 6 shows that of the 191 infants delivered, both before the death of the mother or by postmortem extraction, 128 were liveborn and 63 were stillborn. Of the 128 liveborn infants, 21 died neonatally. It is significant to compare

TABLE 6.—*Data on Newborn of Mothers Who Died*

	Live Births	Fetal* Deaths	Total Births	Neonatal Deaths	No. Survived of Live Born	Percentage Survived of Total Births
1948.....	41	19	60	7	34	56.7
1949.....	52	20	72	6	46	63.9
1950.....	35	24	59	8	27	45.8
1948-1950.....	128	63	191	21	107	....
Percentages	67.0	33.0	..	16.4	83.6	56.0

* Fetuses advanced to 20th week of uterogestation.

the percentages in the infants of women who died (67% liveborn, 33% stillborn, 16.4% died neonatally, and 56% surviving infants), with the figures for the total hospital births (98.5%, 1.5%, 1.9%, and 96.6%, respectively, in 1950).

Table 7, which shows an increase in the percentage of postmortem examinations from 29.1% in 1948 to 45.5% in 1950, gives evidence of greater interest and concern on the part of the medical profession in getting fuller information on maternal losses. Through an arrangement made early in 1951 between the Department of Public Health and the Illinois Society of Pathologists, it is hoped that there will be a still further effort for investigation of anatomic causes of maternal deaths.

Table 8 grades the quality of prenatal care according to the standards set up by the American Committee on Maternal Welfare. It is noted that in 40.9% this care was either poor or absent. It is, however, encouraging to note the trend for betterment in supplying adequate care, with an increase from 10.1% in 1948 to 25.8% in 1950, and the consequent decrease in poor care from 44.3% in 1948 to 16.7% in 1950.

Table 9 grades the quality of hospital records according to the standard approved by the American College of Surgeons. Records graded "excellent" have increased from 16.5% in 1948 to 34.8% in 1950; the percentage of records considered "poor" have dropped from 26.6% in 1948 to 13.7% in 1950. It should also be observed that, although prenatal care is a joint responsibility of physician and patient, the duty of adequate record-keeping must be assumed entirely by the physician.

TABLE 7.—*Maternal Autopsies*

	No. Performed	Percentage of Total	No. Not Performed	Percentage of Total
1948.....	23	29.1	56	70.9
1949.....	36	45.0	44	55.0
1950.....	30	45.5	36	54.5
1948-1950.....	89	39.6	136	60.4

SUMMARY

A summary is presented of a three year study, from 1948 through 1950, of 321 deaths associated with gestation in downstate Illinois. The 225 cases in which the death was classified as due to obstetric causes are discussed in detail. The study was effected through compilation of data on records and personal interviews of physicians by the consultant in maternity of the Bureau of Maternal and Child Health of the Illinois Department of Public Health. The audit of the case histories was made by the Maternal Welfare Committee of the Illinois State Medical Society.

Hemorrhage was the cause of death in 35.5%, toxemia in 25.7%, and infection in 13.1%. In the remaining 25.7% of deaths attributed to various conditions, embolism was the cause in 13.5%, and anesthesia in 5.1%. Nearly one-half of all mothers died within 24 hours after admission to the hospital; more than one-half of all mothers died within 24 hours after delivery; three out of every five maternal deaths were due to hemorrhage and/or toxemia. Natural births occurred in 30.8%; cesarean section was done in 43.2%; and other operative procedures were resorted to in 26%.

Evidence of improvement in downstate Illinois was noted by the following figures for 1948 and the comparable data for 1950. 1. The maternal mortality rate per 1,000 live births decreased from 0.87 to 0.61. 2. The percentage of cases in which autopsy was performed increased from 29.1 to 45.5. 3. The incidence of errors in certifying causes of death decreased from 23.6% to 6.2%. 4. The percentage of births in hospitals increased from 92.9% to 95.7%. 5. The percentage of cases with adequate prenatal care increased from 10.1% to 25.8%. 6. The proportion of records considered excellent increased from 16.5% to 34.8%.

The study demonstrated its value in acquisition of knowledge and attainment of higher standards in obstetric practice. It pointed to the desirability of maintaining and bettering advances already achieved. It directed attention to the need for better education of the medical student, the practitioner, and the laity in obstetric problems. It emphasized the urgency for early diagnosis of complications, for adequate consultation, for immediate availability of proper facilities in treatment, for judicious intranatal management, for avoidance of unwarranted operative intervention, and for correct postnatal follow-up. If these needs are met, there will result a still greater saving of lives of mothers.

TABLE 8.—*Quality of Prenatal Care*

	1948		1949		1950		Total	
	No.	%	No.	%	No.	%	No.	%
Adequate.....	8	10.1	18	22.5	17	25.8	43	19.1
Fair.....	19	24.1	23	28.8	15	22.7	57	25.3
Poor.....	35	44.3	20	25.0	11	16.7	66	29.3
None.....	9	11.4	10	12.5	7	10.6	26	11.6
Unknown.....	8	10.1	9	11.2	16	24.2	33	14.7
Total.....	79	100.0	80	100.0	66	100.0	225	100.0

TABLE 9.—*Quality of Records*

	1948		1949		1950		Total	
	No.	%	No.	%	No.	%	No.	%
Excellent.....	13	16.5	20	25.0	23	34.8	56	24.9
Good.....	17	21.5	16	20.0	20	30.3	53	23.5
Fair.....	28	35.4	25	31.3	12	18.2	65	28.9
Poor.....	21	26.6	17	21.2	9	13.7	47	20.9
None.....	..	....	2	2.5	2	3.0	4	1.8
Total.....	79	100.0	80	100.0	66	100.0	225	100.0

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EPIDEMIC OF TUBERCULOSIS IN A HIGH SCHOOL

REPORT OF EIGHT YEAR FOLLOW-UP OF STUDENTS EXPOSED

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An unusual incidence of progressive pulmonary tuberculosis occurred in a rural New York high school in which during a two year period 13 of 133 pupils and one of their teachers were found to have the disease. Tuberculosis developed in two additional students in this group and one from the next lower class within the subsequent eight years.

Explosive outbreaks of pulmonary tuberculosis among pupils of high school age are rare, although sporadic cases secondary to an active case in a school population are not uncommon. In 1949 Roe and Dick [1] reported the investigation of a school group in which a master and 12 of 342 boys 13 to 17 years of age were discovered to have tuberculosis. They cited reports in the literature of school epidemics of tuberculosis among children under the age of 13, but could find only one report, that of Hyge,[2] concerned with students of high school age. In that epidemic, in which the source was traced to a teacher, 45 cases of pulmonary tuberculosis occurred among 305 school girls 12 to 18 years of age.

This study deals with a central rural school situated in open country amid scattered farms remote from any city or village. The school serves a community having a rural white population estimated at 2,731. The tuberculosis morbidity and mortality in this area are not significantly different from those in other rural sections of New York. The school population ordinarily includes about 300 pupils in the first eight grades and about 100 in the high school, with some 26 teachers and 10 other employees. Most of the pupils are transported by school buses and have their noon meal in the school cafeteria. The building is modern, adequately equipped, well lighted and ventilated, and kept in good condition. There are no obvious faults in general sanitation or unusual features that might account for the spread of tuberculosis.

Although the school group had not been examined, there were no known cases of tuberculosis in the school until July, 1942, when the diagnosis was made in the initial case (case 1) in this series one month after the patient had graduated. During the next 14 months four of his former schoolmates who had left school at the same time were found to have pulmonary tuberculosis (cases 2 to 5). The discovery of these five cases within a little more than a year after the patients had left school, with no known familial exposure to the disease, suggested the possibility of a common source of infection and the need for examination of their associates at school to discover, if possible, the source case and others who might have been infected.

CHEST X-RAY SURVEYS

The school faculty and employees, and the students of the seventh and eighth grades and high school were examined by roentgenograms in December, 1943. One of the teachers and four of the students in the high school were thus found to have pulmonary tuberculosis (cases 6 to 10) and were promptly excluded from school. Reexamination of the high school students in April, 1944, revealed two additional cases (cases 11 and 12, chart 1) in pupils who had no abnormality at the previous examination. The pupils of the first eight grades who had positive tuberculin reactions were examined at this time, and no cases were found among them.

A community-wide chest x-ray survey was conducted in the area served by the school in May, 1944. No cases of tuberculosis were found among the 878 persons examined. All faculty members with the exception of one grade school teacher and all employees who had left the school between September, 1941, and the time of the first survey in December, 1943, were examined by x-ray studies, and no cases of tuberculosis were found among them.

FOLLOW-UP

No additional cases were found among the pupils who continued in high school and the tuberculin reactors in the first eight grades at reexaminations in November, 1945, May, 1946, and finally in March, 1948. The study of the pupils who remained in school was concluded with the last-mentioned examination, since all of those who had been in school during the school year 1943-44 when the last cases were discovered would either have graduated or left school by that time. The pupils who graduated or left high school between September, 1941, and June, 1945, were consistently followed after they left school. Of these 122 (133 less 11 cases) former students, 108 were examined one or more times after leaving school. Among them five additional cases (cases 13, 14, 15, 16, and 17) were found. Fourteen former high school students were lost to further observation after leaving school.

TUBERCULIN SURVEYS

After the preliminary screening chest x-ray survey examination in December, 1943, a time interval was allowed for the possible development of allergy resulting from exposure to the last-discovered cases. To determine the incidence and prevalence of infection and to provide information for use in follow-up, the pupils of the lower

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This article has been abbreviated by the omission of charts 1 and 2 and tables 1, 2 and 3. These will appear in the authors' reprints.

Read before the Section on Diseases of the Chest at the One-Hundredth Annual Session of the American Medical Association, Atlantic City, June 13, 1951.

From the Homer Folks Tuberculosis Hospital (Dr. Horton, Director) of the New York State Department of Health (Dr. Champlin, Regional Health Director, Dr. Rogers, District Health Officer, and Dr. Korns, Director, Bureau of Epidemiology and Communicable Disease Control).

1. Roe, J. T. N., and Dick, W. P.: Tuberculosis Survey of Suspected School Group, Tubercle **30**: 39 (Feb.) 1949.

2. Hyge, T. V.: Epidemic of Tuberculosis in State School, with Observation Period of About 3 Years, Acta tuberc. Scandinav. **21**: 1, 1947.

grades as well as those in the high school were tested with 0.0002 mg. of purified protein derivative of tuberculin intracutaneously in April, 1944, May, 1946, and March, 1948. The results of these surveys are compared in table 1 with those carried out in nearby schools during the period 1939-1944. In 1944 there was a higher percentage of reactors in all grade levels, and particularly in grades 9 to 12, in the study school as compared with the composite of nearby schools (chart 2).

The average percentage of tuberculin reactors in the school dropped from 26.5 to 8.9% during the four year period from 1944 to 1948. This latter figure approximates the mean percentage of 6.4, which was the proportion of reactors among 30,642 students of schools in New York State examined [3] in 1946-47. This return in 1948 to the average percentage of tuberculin reactors expected in such a school population is a reflection of the control measures taken in the school.

CLINICAL CHARACTERISTICS

All patients were hospitalized, and while they were being treated by bed rest, the disease was found by clinical [4] and laboratory study and serial roentgenologic observations to be active in all. Tubercle bacilli were recovered from the sputum or gastric contents in all except one (case 2), who had tubercle bacilli in the spinal fluid. At the time of discovery the disease was far advanced in 1, moderately advanced in 5, and minimal in 11. It was unilateral in 11 and bilateral in 6. The lesions in two (cases 6 and 16) were considered as being predominantly fibrotic. In the remaining 15 they were regarded as being predominantly exudative, and in 6 they were of the type usually described as the early infiltrate.

During the early months of treatment the disease, as noted by serial chest x-ray films, was unstable or progressive in 15, stationary in 1 (case 16), and retrogressive in 1 (case 12). Collapse therapy was required in eight. Three patients died, 2 are still hospitalized, and the disease in the remaining 12 is inactive, with sputum or gastric contents culturally negative for tubercle bacilli.

EPIDEMIOLOGY

All of the cases among pupils occurred in the high school classes. The first-discovered case was among those who graduated or left school in June, 1942, and the last case in those at school was found in April, 1944. Thus the student population who may have been exposed to the infection at school consisted of those who were registered in the school during the three school years 1941-42, 1942-43, and 1943-44. Of the total high school registration of 203 during this period, 119 were girls, among whom 14 cases occurred, and 84 were boys, among whom only 2 cases were found.

Considering the initial case as the primary case, the number of pupils concerned was 133, the total high school registration for the single school year 1941-42. All of the discovered cases among the pupils except one (case 15) were in this group. When it is considered that the disease was diagnosed in 13 of them within the succeeding two years, an attack rate of 9.8% for that period, and also that it was diagnosed in the teacher who was associated with them, the explosiveness of the outbreak is emphasized.

All of the pupils were native-born white persons from farm or small village homes. Their level of nutrition and living conditions were reasonably good. There was no unusual environmental strain, such as physical excesses, emotional experiences, or dietary irregularities. There had been no epidemics of acute respiratory illnesses in the school other than the expected incidence of common colds.

With only two exceptions, the father of one (case 5) and stepmother of another (case 9), all of the family members and household associates of each patient were examined. The 18-year-old sister of the patient in case 1, who attended another school and is not included in this series of cases, was found to have tuberculosis, which was regarded as secondary to that of her brother. Case 3 was discovered through examination of family members of the patient in case 2 and may possibly have been a secondary case, although both students attended the school at the same time. There was no other family history of exposure to tuberculosis in any of the cases. There was no significant extraschool contact in any of the discovered cases, except in the initial case. In this case the source of infection was traced to a sporting goods dealer who was a Boy Scout master. This man died of tuberculosis soon after the diagnosis was made in the initial case in this series.

School buses were considered as a possible mechanism for spread of the disease, and while all but two of the patients reached school by bus, only three of those who had tuberculosis rode together, two used another bus, two rode together in a third bus, and the remaining patients reached school by separate buses.

Most of the pupils who were found to have tuberculosis had their meals at the school cafeteria and consumed the pasteurized milk served there. Laboratory study of the tubercle bacilli in all of the cases indicated that they were human and not bovine strains of tubercle bacilli.

All of the pupils in whom tuberculosis developed, with the exception of the patient in case 15, were in school during the last half of 1942. She was in the eighth grade then, and entered the high school the following autumn. Activities of the high school students were usually separate from those of the lower grades, except for general assemblies, athletic events, and school parties. The two groups of students had their meals at different hours and used separate classrooms. The patient in case 15, however, may have had some contact with a patient who was in the high school during the latter half of 1942. Careful questioning and the study of classroom and extramural activities in each case revealed only one situation common to the whole group. All the pupils in whom tuberculosis developed were taught by the teacher (case 6) at some time; eight were also in her homeroom for periods ranging from one-half to two years. Various classrooms in the school were used by her, and they were also used by other teachers. This teacher taught two classes in which no cases of tuberculosis developed.

In a small school such as this, many of the patients had association with each other in various classes and homerooms, and there was, of necessity, a certain amount of

3. Tuberculosis Control Efforts 1946-1947, Annual Report, New York State Education Department, 1947.

4. Terminology According to Diagnostic Standards and Classification of Tuberculosis, New York, National Tuberculosis Association, 1950.

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association in the corridors when changing classrooms, and in the homerooms, auditorium, cafeteria, cloakrooms, and washrooms. Some of the associations of the patients with each other in school are not unlike those among schoolmates reported by Downes.[5]

A factor that seemed to be common to a majority of the cases and that may possibly have had some significance was that, of the 16 students who had tuberculosis, 8 sang in the school chorus in 1941-42 and 5 (4 of the 8 and 1 additional) in 1942-43 (cases 3, 4, 7, 8, 9, 10, 12, 14, and 17). In the first year this group consisted of 37 girls and 15 boys, while in the second year it contained 34 girls and 14 boys. The chorus routinely met twice a week, rehearsing in the gymnasium and various classrooms for periods up to one hour. No information of significance was obtained concerning the usual seating arrangement or other details about the intimacy of contact during these rehearsals. One of the girls played the piano, four were in the soprano section, and one sang alto. Two girls (cases 8 and 10) sang in a quartet, together with two persons in whom tuberculosis did not develop. The tuberculin sensitivity of pupils who sang in the chorus in these two years fails to indicate that the chorus members had a significantly different ratio of tuberculin sensitivity from their classmates who did not sing in the chorus. The participation of these 16 students in the school chorus has some resemblance to the occurrence of four cases of tuberculosis attributed to exposure to an active case in a church choir, reported by Twinam and Pope.[6]

No other comparable concentration of cases in a single activity was encountered, except that the gymnasium classes were attended by all students. However, sex and age classifications divided participation in the gymnasium into groups, none of which showed a concentration of cases.

In 1941-42 five of the patients played in the orchestra, composed of 26 members, and 6, including 4 of the above-mentioned, played in the band composed of 52 members in the same year. The possibility that the school band might have served as a source of spread of tuberculosis through the exchange of wind instruments with contaminated mouth pieces was considered, but study of this possibility tended to exclude it as a factor. A number of other associations of the patients with each other, but to a lesser degree, were observed, none of them strikingly significant.

COMMENT

The foregoing observations would seem to give an adequate explanation of how tuberculosis may have spread from one or more infectious cases in the school. The circumstances in themselves, however, were not unusual and are probably duplicated in most other schools. The initial case occurred in a boy who was not especially friendly with those in the other cases. He had cough and expectoration beginning in March, 1942, and, remained in school until graduation on June 23, 1942. On June 20 he had a temperature of 103 F. On July 9, when examined by x-rays for the first time, he had moderately advanced bilateral pulmonary tuberculosis, with cavity and sputum positive for tubercle bacilli. During his last four months in school he undoubtedly was infectious, because by July he had infected his sister, and it seems likely that he was the source case in the school.

The possibility that the teacher was the source case or one of the source cases was considered. She entered the school in January, 1942, and taught all of the patients. Unfortunately she had not had a tuberculin test or chest x-ray examination prior to the school chest x-ray survey in December, 1943, when her disease was discovered. It is possible that it may have been present for some time, and it is conceivable that at some time in the past it may have been active and in a communicable stage. She had been well, however, and had had no cough, expectoration, or other symptoms suggesting tuberculosis until October, 1943, when she noted undue fatigue with anorexia and weight loss. A gastric contents culture on Dec. 6, 1943, grew two colonies of tubercle bacilli, and that of Jan. 7, 1944, grew three colonies, the former confirmed by animal inoculation. All sputum cultures were negative, and many gastric contents specimens cultured during subsequent months were negative for tubercle bacilli. The epidemiological significance of patients with pulmonary tuberculosis who have no roentgenologic evidence of cavity, who have no cough, and in whom tubercle bacilli can be demonstrated only by culture of gastric contents in low numbers of colonies is questionable. She was only a few years older than the students and rather than being the source case or one of the sources, her case may well have been secondary. Regardless of the identity of the original source case in school, there were during the period of observation other cases capable of spreading the infection before they were diagnosed, so that the sources of infection were multiplied.

In considering the factors responsible for the unusual prevalence of tuberculosis in this school group, the question naturally arises as to whether these students lacked inherent native resistance or acquired resistance to tuberculosis. The age of adolescence and the female sex were undoubtedly significant.[7] There is no information available regarding the prevalence of tuberculous infection in the community, such as would be indicated by previous tuberculin test surveys. In view of the rural character of the community with its low mortality rate and scarcity of residents with tuberculosis, many of the inhabitants may never had come in close contact with tuberculosis. Judging from tuberculin records of high schools in surrounding areas and in the study school about four years after the epidemic (table 1), it is possible that at the time the first case was introduced into its midst most of the student population of the school had probably not been exposed previously to tuberculosis and the students in whom tuberculosis developed became ill following their primary infection largely because they had had no prior opportunity to develop specific relative immunity. This presumable lack of resistance, more than the factors of exposure and mechanics of transmission, may have been responsible for the explosive and extensive nature of the outbreak.

5. Downes, J.: How Tuberculosis Spreads in Rural Community, Am. J. Pub. Health **26**: 30 (Jan.) 1936.

6. Twinam, C. W., and Pope, A. S.: Pulmonary Tuberculosis Resulting from Extra-Familial Contacts, Am. J. Pub. Health **32**: 1215 (Nov.) 1942.

7. Heaf, F. R. G.: Infection and Disease, with Special Reference to Tuberculosis, Brit. J. Tuberc. **45**: 41 (April) 1951.

Without prior tuberculin tests it was impossible to determine in the discovered cases whether the lesions were due to progressive primary tuberculosis or to reinfection. From the data at hand, however, it seems likely that most of them were primary infections. Pulmonary infiltrates that develop in adolescents and adults have much the same clinical and roentgenologic characteristics, whether due to primary infection or reinfection, and it is impossible by such methods of examination to distinguish one from the other.[8] Lymph node swelling was not demonstrable clinically or roentgenologically in any of the cases, and calcification of parenchymal or lymph node foci was observed roentgenologically in only one instance (case 10). At necropsy the disease was regarded as primary in two of the three patients who died (cases 2 and 15). It was impossible to establish with certainty whether the disease was primary or a reinfection in the other (case 1).

The liability to clinical and more active disease during the few months or years following the first infection in adolescence is recognized. The exposure of a susceptible group to one or more infectious cases may have accounted for the fact that there were many cases of clinical disease rather than subclinical infections. The seriousness of pulmonary tuberculosis in adolescents and young adults has been emphasized by Myers[9] and others.[10] Amberson[11] has stressed the instability of such lesions and, especially in females, their strong tendency to progress.

SUMMARY

An epidemic of progressive pulmonary tuberculosis in a high school is reported. Among 133 pupils enrolled during a single school year, 13 cases were discovered within the succeeding two year period. A 23-year-old teacher associated with them was also found to have the disease. During the subsequent eight year period, tuberculosis developed in two additional students in this group and one from the next lower class who entered the high school the following year. The ages of the pupils at the time of diagnosis ranged from 16 to 21 years. Diagnoses were made through chest x-ray surveys and confirmed by the isolation of tubercle bacilli from the sputum or gastric contents in all except one patient, in whom tubercle bacilli were demonstrated in the spinal fluid. All had active progressive pulmonary tuberculosis and were hospitalized. There were three deaths. Two patients are still hospitalized. The remaining 12 have recovered clinically, have inactive disease with sputum or gastric contents culturally negative for tubercle bacilli, and are well and working.

There was no significant familial exposure to tuberculosis except possibly in one case. The probable source case was the initial case, whose infection it was possible to trace to an extrafamilial source outside the school. An extraschool source could not be found in any of the other cases. The explosiveness and extent of the outbreak were attributed to repeated exposure of a susceptible group.

Homer Folks Tuberculosis Hospital (Dr. Horton).

8. Diagnostic Standards and Classification of Tuberculosis, New York, National Tuberculosis Association, 1950.

9. Myers, J. A., and Kernkamp, L. M.: Tuberculosis Among Girls and Boys in Their Teens, Am. Rev. Tuberc. **21**: 509 (April) 1930.

10. Morgan, R.: Certain Aspects of Pulmonary Tuberculosis in Children, with Special Reference to Prognosis, Am. Rev. Tuberc. **29**: 577 (May) 1934. Zacks, D.: Pulmonary Tuberculosis in Second Decade of Life: Its Treatment and Prognosis, ibid. **39**: 703 (June) 1939. Horton, R.: Tuberculosis in Adolescents and Young Adults, New York State J. Med. **42**: 2131 (Nov. 15) 1942.

11. Amberson, J. B., Jr.: Significance of Latent Forms of Tuberculosis, New England J. Med. **219**: 572 (Oct. 13) 1938.

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APPRAISAL OF PROTECTIVE VALUE OF BCG VACCINE

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The logical approach to the development and evaluation of a specific immunizing agent against tuberculosis requires not only an understanding of the fundamentals of immunity but an appreciation of the many factors that make such an evaluation difficult. These factors include variations in the biology of the tubercle bacillus, the susceptibility of the host, the pathogenesis of the disease, the degree of exposure, social and economic factors, and an almost universal decline in the morbidity and mortality from tuberculosis. The diversity of opinion as to the part played by these different factors in the epidemiology and pathogenesis of the disease and the existence of two widely separate schools of thought on the role of allergy are proof of the intricacy of the problem.

From the Henry Phipps Institute, University of Pennsylvania, and the Branch of Health, Bureau of Indian Affairs, Department of the Interior, Washington, D. C.

1. Marfan, A.: De l'immunité conférée par la guérison d'une tuberculose locale pour la phthisie pulmonaire, Arch. gén de méd. **17**: 423, 1886.

It is our view that the evidence for the development of acquired resistance following primary infection with tubercle bacilli is sound. Increased resistance to reinfection can be demonstrated in susceptible animals treated with minute numbers of viable, virulent tubercle bacilli administered as a single dose, or in repeated doses at appropriately spaced intervals. Similar results have been obtained following the use of large numbers of viable avirulent cultures of tubercle bacilli, such as the R_1 human type of Saranac Lake, the BCG bovine type of the Pasteur Institute, or closely related viable mycobacteria, such as the murine type or vole bacillus.

The immunity in tuberculosis is not as complete as the immunity following such a bacterial disease as typhoid or the immunity following certain virus infections. Furthermore the immunity in tuberculosis tends to decrease with the disappearance of viable tubercle bacilli. The observations of Marfan[1] in 1886 that pulmonary tuberculosis occurred infrequently in those who

had evidence of healed cervical adenitis has been confirmed by many observers. Of special interest are the observations of Treon,[2] who in 1888 described his medical experience among the Sioux Indians of Dakota. He reported, "I have noticed that patients who have large glands and scrofulous sores do not as a rule have phthisis pulmonalis." More recently Bordley and Baylor [3] observed 79 persons who had had tuberculosis of the cervical lymph nodes or tonsils 11 to 23 years previously. In no instance could they demonstrate evidence of pulmonary tuberculosis.

At the present time the almost general acceptance that some degree of increased resistance follows a primary infection is predicated on the infrequency with which a second primary complex is found, on the containment and disappearance of viable tubercle bacilli in arrested lesions,[4] on the localization and chronicity of the lesions of reinfection, and on the infrequency of bacillaemia and hematogenous spread of the disease to other organs.

The mechanism of immunity in tuberculosis has been carefully investigated by Willis.[5] This investigator found that migration of virulent tubercle bacilli from the site of injection was greatly retarded in guinea pigs previously treated with viable, avirulent tubercle bacilli and that only a small number of the organisms of reinfection reached the remote parts of the body. Freund and Angevine [6] found that tubercle bacilli introduced into the skin of rabbits immunized by heat-killed tubercle bacilli were fixed at the site of injection, and their spread to other parts of the body was retarded.

The impracticability of using viable virulent tubercle bacilli in man to induce resistance and the inconclusive results following the use of nonviable tubercle bacilli has led to widespread investigations of the value of viable, attenuated cultures of tubercle bacilli as immunizing agents. One of the most widely used of such cultures has been the BCG culture of Calmette and Guerin.

The BCG culture originated from a virulent, bovine type tubercle bacillus isolated in 1902 from the tuberculous udder of a cow. This culture was originally known as "souche lait Nocard." According to Calmette and Guerin,[7] this culture was attenuated as a result of transplanting the original culture for 230 generations over a period of 13 years on potatoes impregnated with beef bile and glycerine. This attenuated strain has retained the cultural, tinctorial, antigenic, and tuberculogenic properties of the original culture, as well as the ability to produce potent tuberculin. It differs, however, from the original culture in that it does not produce progressive tuberculosis in animals as susceptible as the guinea pig.

BCG vaccine was first used in France in 1921. Since then it has been estimated that approximately 50 million persons of various ages living in different parts of the world, some under the most adverse and primitive conditions, have received the vaccine. It can be stated unequivocally that up to the present time there has been no evidence that the BCG culture has produced progressive tuberculosis in animals or man. Despite the extensive use of BCG vaccine there is a diversity of opinion regarding its value. This in great part has been due to lack of adequately controlled investigations and to the difficulty of dissociating the specific protective role of BCG vaccine from an almost universal spontaneous decrease in the morbidity and mortality from tuberculosis, antedating the use of BCG vaccine.

In order to appraise as objectively as possible the specific value of BCG vaccine in control of tuberculosis, a joint investigation was undertaken by the Henry Phipps Institute, University of Pennsylvania, and the Branch of Health, Bureau of Indian Affairs, Department of the Interior. This study was initiated in December, 1935, and it was not until February, 1938, that all of the injections of BCG vaccine and saline solution were completed in the different areas.

The selection of the Indian population for this study was based on the interest of the Bureau of Indian Affairs in using all possible control measures to reduce the mortality and morbidity from tuberculosis among these people. Furthermore, the ease of following these Indians over a long period of time, the relatively uniform low economic and housing conditions, coupled with the high morbidity and mortality from tuberculosis, made this an ideal group for determining the effectiveness of BCG vaccine.

This investigation was conducted in five different geographical areas and included eight different tribes. These are the Pima Agency, Arizona, inhabited by the Pima tribe; the Wind River Agency, Wyoming, inhabited by the Shoshone and the Arapaho tribes; the Turtle Mountain Agency, North Dakota, inhabited by Chippewas; the Rosebud Agency, South Dakota, inhabited by Sioux Indians; and 12 communities of southeastern Alaska peopled by members of the Thlingit, Tsimpsian, and Haida tribes. These agencies and communities are widely scattered, and the inhabitants live under greatly differing climatic conditions. They vary in their dietary habits and represent different social and cultural patterns. In general, their economic condition is low, housing poor, and homes overcrowded.

To obtain the full cooperation of the Indian population meetings were held with the tribal councils and with the general population in different parts of the reservations. The purpose of the tuberculin test and x-ray examination and the procedure of immunization were explained. As a result of these meetings, excellent cooperation was obtained at the inception of the study, and this interest has continued.

PLAN OF STUDY

The importance of collecting basic data dealing with the occurrence of tuberculosis among the Indian population was realized. Following a reconnaissance of the various agencies and of southeastern Alaska, it was ap-

2. Treon, F.: Medical Work among the Sioux Indians, J. A. M. A. **10**: 224 (Feb. 25) 1888.

3. Bordley, J., III, and Baylor, J. W.: Prognosis in Cases of Tuberculosis of the Tonsils, Adenoids and Cervical Lymph Nodes: Study of Patients Followed for 11 to 23 Years, Bull. Johns Hopkins Hosp. **63**: 132, 1938.

4. Opie, E. L., and Aronson, J. D.: Tubercle Bacilli in Latent Tuberculous Lesions and in Lung Tissue Without Tuberculous Lesions, Arch. Path. **4**: 1, 1927. Feldman, W. H., and Baggenstoss, A. H.: The Residual Infectivity of the Primary Complex of Tuberculosis, Am. J. Path. **14**: 473, 1938.

5. Willis, H. S.: Studies on Tuberculous Infection: XI. The Early Dissemination of Tubercle Bacilli after Intracutaneous Inoculation of Immune Guinea Pigs of Reinfection, Am. Rev. Tuberc. **11**: 439, 1925.

6. Freund, J., and Angevine, D. M.: The Spread of Tubercle Bacilli in the Bodies of Sensitized and Immunized Animals, J. Immunol. **35**: 271, 1938.

7. Calmette, A., and Guerin, C.: Sur quelques propriétés du bacille tuberculeux cultivé sur la bile, Compt. rend. Acad. d. sc. **147**: 1456, 1908.

parent that no precise information was available on the incidence of tuberculosis, and in most instances no objective data to support a diagnosis of tuberculosis. This was due, in 1935-1936, in great part to lack of x-ray and laboratory equipment. Since then the Office of Indian Affairs has equipped all hospitals with x-ray units and adequate clinical laboratory facilities.

The initial phase of this study consisted of determining the mortality and morbidity from tuberculosis and the incidence of tuberculous infection in the general population. These data were to be an index of the extent of tuberculosis and the basis for calculating the possible risk of exposure to this disease in the group to be studied subsequently. The mortality from all causes and from tuberculosis was compiled from the available death certificates on each agency. The rates for total deaths are approximations only, because of delays in filing death certificates and failure in registering deaths. Similarly the mortality rates from tuberculosis are far from accurate because of unsubstantiated diagnoses, the tendency to diagnose tuberculosis too frequently, and the many death certificates giving the cause of death as "unknown." This latter circumstance can be attributed to absence of medical care in some areas or to inaccessibility of hospitals, and

TABLE 1.—*Distribution by Sex and Five Year Age Periods of BCG Vaccinated Persons and Controls*

Age in 5 Year Periods *	Number Vaccinated			Number of Controls		
	Males	Females	Total	Males	Females	Total
Under 5	204	229	433	213	200	413
5- 9	306	353	659	322	302	624
10-14	191	196	387	170	181	351
15-19	36	36	72	33	36	69
Total	737	814	1,551	738	719	1,457

* Age at beginning of study.

at times to lack of interest by certain medical personnel. Thus, in one area the percentage of certificates listing "cause of death unknown" fell from 20 and 23% in two successive years to 0.5% when the medical officer was replaced.

Because of the general impression that tuberculosis is widespread among Indians, there is a tendency to make this diagnosis without confirming evidence. Sudden and marked changes in the mortality rate from tuberculosis have been associated also with change of medical personnel. This was exemplified in the tuberculosis mortality rate for the Turtle Mountain Agency when the death rate from this disease dropped from 373 per 100,000 in 1941 to 27 in 1942 and to zero in 1944.

While annual population figures for the natives of southeastern Alaska are not available, the statistical data assembled in 1936 indicated a population of 4,190 natives in the 12 communities of southeastern Alaska included in this study. Unfortunately the number of deaths from tuberculosis for these communities is not available; however, the death rate from tuberculosis for the natives of the Territory of Alaska ranged between 709 and 1,049 per 100,000 during the decade of 1930-1940, inclusive.

The incidence of tuberculous infection was determined by means of the tuberculin test. This was carried out by members of the Tuberculosis Control Unit, which was organized by the Bureau of Indian Affairs to study the protective value of BCG vaccine. The tuberculin test was conducted on a total of 8,420 persons, ranging in age from less than 1 year to 60 years and over. This group represented a cross-section of the population, including all children attending the government and denominational schools.

An initial intracutaneous injection of 0.00002 mg. of purified protein derivative of tuberculin was made in the forearm. Readings were made 48 hours after the injection and, if they were negative, these persons were reinjected with 0.005 mg. of purified protein derivative and second readings made 48 hours later. The same preparation of purified protein derivative of tuberculin (trichloracetic acid preparation), supplied by Dr. Florence Seibert of the Henry Phipps Institute, was used for the first five years of the study; after that time another sample (an ammonium sulphate preparation), also supplied by Dr. Seibert, was used. The required dilutions of purified protein derivative were prepared daily from the concentrated solution, and were not used when more than 24 hours old. The injections and interpretations of the tuberculin reaction were made with but few exceptions by the same persons throughout the study. The incidence of tuberculous infection as determined by the tuberculin test varied little on the different agencies. The mortality rate from tuberculosis on the Indian reservations studied ranged from 200 to 300 per 100,000, while the mortality rate in Alaska ranged from 500 to 600 per 100,000.

Hypersensitivity to tuberculin is marked among American Indians. Among those who reacted to tuberculin, 91.1% had positive reactions to the initial dose of 0.00002 mg. of purified protein derivative and approximately 5% of those who reacted had a 4+ reaction characterized by vesiculation and necrosis. The percentage of those who react to tuberculin increases rapidly in increasing five year age groups.

The morbidity from tuberculosis among the general population was determined by roentgenologic examination of the chest of an unselected sample of the population. The proportions examined by x-rays ranged from 30.6% of the population on the Rosebud Agency to 77.6% of the Indian population of southeastern Alaska. Pulmonary lesions compatible with a diagnosis of tuberculosis ranged from 1.1% of those examined roentgenologically on the Pima Agency, Arizona, to 6.9% among those living in southeastern Alaska. The data collected from agency records indicated that tuberculosis was the most frequent cause of death, and the data compiled by the Tuberculosis Control Unit, following the tuberculin testing and x-ray examinations, indicated a high incidence of tuberculous infection and disease.

With completion of the phase of the work dealing with the mortality and morbidity from tuberculosis and with the incidence of tuberculous infection in the areas selected for the study, the group to be included in the evaluation of BCG vaccine was next selected. The criterion for inclusion in this group was failure to react to both 0.00002 mg. and 0.005 mg. of purified protein derivative of tuberculin. Separate cards were prepared for all persons in the preschool and school population who did not react to either dose. Each card gave the name, sex, birth date, school or school district, date, and result of the initial

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tuberculin test. The cards for each school were then sorted according to sex and year of birth. By alternation each age group of both males and females was divided into two approximately equal groups. Of these two groups, one received an intracutaneous injection of either 0.1 or 0.15 mg. of freshly prepared BCG vaccine in the skin over the region of the deltoid muscle, while the other group received an injection of 0.1 ml. of isotonic sodium chloride solution and served as controls. In a small number of instances a person designated to receive the BCG vaccine was absent from school, and a person from the group originally listed as a control was substituted. The comparability of both groups according to age and sex at the initiation of the study is indicated in table 1.

The name and location of the agencies, name of tribe, number vaccinated, number of controls, year when study was initiated, and the number of years and persons observed are summarized in table 2. At the time of vaccination the local Indian Service Public Health nurses prepared a personal and household record for each of the vaccinated and control persons. The personal record supplied pertinent data applying to the medical history of each person, while the household record consisted of a description of the household with the number and ages of all members therein, details of living conditions, and medical histories. These records were kept current between the annual visits of the Tuberculosis Control Unit by the addition of all medical data relating to the individual and to the household, with especial reference to exposure to tuberculosis.

TABLE 2.—*Year Study Was Initiated, Length of Observation, and Number of BCG Vaccinated Persons and Controls, by Agency and Tribe*

Agency	Tribe	Month and Year Initiated	Month and Year Last Observed	No. of Years Observed	Vaccinated			Controls		
					No.	No. Traced	Person Years Observed	No.	No. Traced	Person Years Observed
Pima, Ariz.	Pima	Feb., 1936	March, 1951	15	258	258	3,764	263	261	3,760
Wind River, Wyo.	Shoshone	July, 1936	June, 1951	15	110	110	1,602	85	85	1,223
Wind River, Wyo.	Arapaho	June, 1936	June, 1951	15	118	118	1,707	106	106	1,435
Turtle Mt., N. D.	Chippewa	Oct., 1936	June, 1951	15	170	170	2,498	162	161	2,358.5
Pima, Ariz.	Pima	Feb., 1937	March, 1951	14	96	96	1,325	86	86	1,166
Rosebud, S. D.	Sioux	Oct., 1937	June, 1951	14	301	294	4,059.5	291	284	3,898.5
Alaska, Southeastern	Tlingit, Haida, Tsimshian	Jan., 1938	June, 1951	13	498	488	6,290	464	461	5,679.5
Total					1,551	1,534	21,245.5	1,457	1,444	19,520.5

PREPARATION OF BCG VACCINE

The 13 different lots of BCG vaccine used in this study were prepared in a mobile laboratory, which was set up usually in a school house and away from all contact with infectious material. The BCG vaccine was used, without exception, within three days after its preparation. The preparation of and local reaction to the vaccine have been reported previously.[8]

Since the interval between the initial tuberculin test and the injection of the vaccine or sodium chloride solution averaged six weeks, a practice no longer followed, it was necessary to consider the possibility that some persons may have been in a preallergic state at the time the tuberculin reaction was negative and that some may have had a tuberculous infection after the testing. To determine this, the site of BCG vaccination was examined 48 hours after vaccination to note whether or not a local, exaggerated inflammatory reaction (Koch phenomenon) had occurred. Such a reaction indicates tuberculous infection preceding vaccination. A total of seven persons showed such a reaction. In five cases this occurred in persons who had been tuberculin positive and who, by error, received the vaccine. In two instances persons who were originally tuberculin negative showed a well-marked Koch phenomenon 48 hours following vaccination. One of these persons died approximately three months later from tuberculous meningitis, confirmed by autopsy, and the other died from pulmonary tuberculosis and tuberculous meningitis nine years later. Despite these circumstances, both cases have been included among the deaths from tuberculosis in the BCG vaccinated group. Of the 3,008 persons included in this study, approximately 85% were examined roentgenologically at the time of, or soon after, the injection of vaccine or isotonic sodium chloride solution.

REEXAMINATIONS

No distinction was made between the two groups either before or after their inclusion in this study. No isolation was attempted, and no modification was made in their mode of living. Both groups were examined at approximately annual intervals by the staff of the U. S. Indian Tuberculosis Control Unit, assisted by local Indian service medical personnel. The importance of the annual examination was stressed, and every effort was made to locate and to examine every person in the study by means of the tuberculin test and x-ray studies of the chest. The percentage reexamined annually by means of the tuberculin test and x-ray studies, as presented in table 3, indicates that a high proportion of those in the study were examined and is almost identical for both groups for any given year.

From 1941 to 1944 the reduction of the staff of the Tuberculosis Control Unit and the number of persons in the study who were either in the armed forces or working off the reservation resulted in a decrease in the percentage examined annually. By June, 1944, when the field work was temporarily discontinued, all groups had been followed for a minimum of six consecutive years and some had had seven annual examinations. In 1946-1947, tuberculin testing and x-ray examinations were again conducted in all areas. In that period, reexamina-

8. Aronson, J. D.; Parr, E. I., and Saylor, R. M.: BCG Vaccine: Its Preparation and the Local Reaction to Its Injection, Am. Rev. Tuberc. 42: 651, 1940.

tions were conducted on the Rosebud Agency and in Alaska for the 9th year after the initiation of the study and for the 10th and 11th year in the remaining areas. Consequently, following the sixth annual visit the percentage of persons reexamined each year is based on the number of cases in the area visited and not on the total of all persons included in the study.

At the time of each annual examination all persons were retested with 0.00002 mg. of purified protein derivative of tuberculin, and those who failed to react after 48 hours were reinjected with 0.005 mg. of the same preparation. As for the initial testing, all dilutions of purified protein derivative were prepared fresh daily with sterile isotonic sodium chloride solution, and no preservative was added to the concentrated or diluted solutions of purified protein derivative. At the time that the tuberculin test was made, or soon after, a roentgenologic examination of the chest was made by means of a mobile x-ray unit operated by the Tuberculosis Control Unit. The films were developed locally at each agency and were interpreted by the radiologist of the unit. Films were identified by number, and the radiologist had no information as to whether the film represented a vaccinated or control case, nor the results of the tuberculin test. At each annual visit to the different agencies, the medical records, x-ray films, and available laboratory reports of all those who had died the preceding year were examined in order to confirm the diagnosis. No diagnosis was accepted without a complete review of all available data.

An analysis of the records for each household included in this study indicated that for the first six years 21.4 and 19.8% of the vaccinated and control groups, respectively, had been exposed to known domiciliary sources of tuberculosis, and that the degree of contact was essentially the same for both groups.[9] It must be realized that in any population, and especially in heavily infected populations, there are in addition to known domiciliary sources of infection, numerous opportunities for extra-domiciliary infection that cannot be determined accurately, but are nonetheless significant. That a significant percentage of the BCG vaccinated persons experienced superimposed infection with virulent tubercle bacilli is indicated by the increased sensitivity to tuberculin of the BCG vaccinated persons who were observed over a period of from 9 to 11 years. This increased tuberculin sensitivity was most marked in areas where the incidence and level of tuberculin reaction became high among the control group.[10]

The morbidity and mortality from tuberculosis and the mortality from all causes have been compared in both BCG vaccinated and controls, and the results after 3, 6, and 11 years of observation have been published previously.[11] With the completion of the reexamination of both groups in 1947, it was decided to discontinue the annual examinations, but to follow both groups at approximately five year intervals in order to determine the mortality rates from all causes and from tuberculosis.

TABLE 3.—*Percentages of BCG Vaccinated Persons and Controls Tuberculin Tested and Examined by X-Rays Each Year*

	Tuberculin Tested										
Year of Observation	1	2	3	4	5	6	7	8	9	10	11
BCG vaccinated persons	96.4	94.5	94.9	95.2	89.7	80.8	78.8	70.4	74.9	68.6	81.3
Controls	90.4	93.7	95.4	92.9	90.0	77.5	81.6	70.4	72.1	72.1	78.3
	Roentgenologic Examination										
Year of Observation	1	2	3	4	5	6	7	8	9	10	11
BCG vaccinated persons	97.4	96.8	96.1	95.9	91.2	84.1	81.8	71.6	76.8	69.0	80.2
Controls	96.8	96.4	96.5	93.9	91.5	81.8	84.1	76.3	72.2	73.1	78.2

EVALUATION

An evaluation of the effectiveness of BCG vaccine cannot be made by comparing current mortality and morbidity rates from tuberculosis with former rates. Such a comparison is not valid, principally because the rates have been decreasing for many years, especially among the younger age group. The significance of the results obtained in this study depends on the equality of the vaccinated and control groups, on the comparability of the number examined annually, on a comparable risk of exposure to tuberculous infection, and on use of the same diagnostic criteria. The comparability of both groups according to age and sex and the comparability of the follow-up have been presented in tables 1 and 3.

In conformity with this policy a recheck of both groups was conducted in March and June, 1951, since 15 years had elapsed since the study was initiated. All of the areas were revisited, and, through the excellent cooperation of agency medical, and school personnel and through contacts with many who were contemporaries of those in the study, we were able to trace 1,534 of the 1,551 who had been vaccinated from 13 to 15 years previously, and 1,445 of the 1,457 controls. At the same time all available death certificates were checked, both at the hospital and at the agency office. If the patient had been hospitalized on or off the agency during his terminal illness, the clinical record, nurses' notes, and laboratory and roentgenologic reports were studied in order to determine as accurately as possible the cause of death.

If the record of every death among the persons in this study included a complete and careful clinical history, autopsy findings, complete laboratory examination, and unequivocal x-ray reports, the evaluation of the effectiveness of BCG vaccine would be more nearly conclusive. In the absence of such complete evidence for all deaths there remains one comparison not affected by diagnostic errors and that is the comparison of deaths from all causes in the vaccinated and control groups. Among the

9. Aronson, J. D., and Palmer, C. E.: Experience with BCG Vaccine in the Control of Tuberculosis Among North American Indians, Pub. Health Rep. **61**: 802, 1946.

10. Aronson, J. D.: The Fluctuation of the Tuberculin Reaction in Different Geographic Areas and its Relationship to Resistance, Am. Rev. Tuberc. **63**: 121, 1951.

11. Aronson,[10] Townsend, J. G.; Aronson, J. D.: Saylor, R., and Parr, E. I.: Tuberculosis Control Among the North American Indians, Am. Rev. Tuberc. **45**: 41, 1942. Aronson, J. D.: Protective Vaccination against Tuberculosis with Special Reference to BCG Vaccination, ibid. **58**: 255, 1948.

1,551 BCG vaccinated persons, who were observed for a total of 21,245.5 person years, there were 71 deaths from all causes, a rate of 3.34 per 1,000 person years of observation. Of the 1,457 controls, who were observed for a total of 19,520.5 person years, 128 persons died, a rate of 6.56 per 1,000 person years of observation. When the cumulative death rate from tuberculosis and nontuberculous causes are calculated on the basis of life table experience (table 4), the cumulative death rate from tuberculosis is found to be significantly higher for the controls than for the BCG vaccinated group. On the other hand, the cumulative death rates from nontuberculous causes for both groups are approximately the same. Among the BCG vaccinated group, beginning with the 10th to 11th year of observation, the increment in the cumulative death rate from tuberculosis is greater than in the earlier years of the study. Although the numbers involved are too small to be significant statisticaliy, they do suggest that the initial increased resistance induced by the BCG vaccine may decrease after the 10th year.

In the absence of routine autopsies the designation of cause of death was based, as previously mentioned, on clinical records (which were available for all but a few cases), nurses' notes, x-ray interpretations, laboratory examination of sputum or spinal fluid, and an occasional autopsy. The criteria that were used to establish the diagnosis of tuberculosis in both the BCG vaccinated and the control groups are listed in table 5.

Of the 12 deaths from tuberculosis among the BCG vaccinated group, 2 occurred in persons who gave a marked Koch phenomenon at the time of examination, as noted earlier in this paper. One died three months after vaccination from tuberculous meningitis, and the other died nine years later from pulmonary and meningeal tuberculosis. One death occurred in a child who had been vaccinated with a sample of vaccine of low potency and failed to react to tuberculin one year after vaccination. One death was due to postoperative hemorrhage and spontaneous pneumothorax 24 hours following a thoracoplasty, and at autopsy moderately advanced tuberculosis was found.

It is valid to include deaths from tuberculosis among those of the vaccinated group who were already infected at the time of BCG vaccination, as indicated by a postvaccinal Koch phenomenon 48 hours later, since it is conceivable that some of the control cases may have

TABLE 4.—*Cumulative Mortality from Tuberculosis and Nontuberculous Causes Per 1,000 Persons*

	BCG Vaccinated Persons						Controls					
	Deaths				Cumulative Mortality Rate per 1,000 Person Years		Deaths				Cumulative Mortality Rate per 1,000 Person Years	
Years of Observation	TB.* No.	Non-TB. No.	No. Untraced	Person Years Observed	TB.	Non-TB.	TB. No.	Non-TB. No.	No. Untraced	Person Years Observed	TB.	Non-TB.
0- 1	2	11	1	1,550.5	1.29	7.10	1	7	2	1,456.0	0.69	4.81
1- 2	0	3	0	1,537.0	1.29	9.03	5	9	2	1,446.5	4.14	11.00
2- 3	1	6	0	1,534.0	1.94	12.91	6	2	0	1,431.0	8.32	12.38
3- 4	1	5	0	1,527.0	2.59	16.14	2	7	0	1,423.0	9.72	17.28
4- 5	0	3	7	1,517.5	2.59	18.03	8	6	5	1,411.5	15.33	21.46
5- 6	0	1	0	1,511.0	2.59	18.68	4	2	0	1,395.0	18.15	22.86
6- 7	0	4	0	1,510.0	2.59	21.28	3	2	3	1,387.5	20.27	24.27
7- 8	1	6	0	1,506.0	3.25	25.18	5	3	0	1,381.0	23.82	26.39
8- 9	0	6	0	1,499.0	3.25	29.08	7	10	0	1,373.0	28.80	33.48
9-10	1	3	8	1,489.0	3.91	31.03	8	4	0	1,356.0	34.53	36.33
10-11	2	2	0	1,481.0	5.25	32.34	5	4	0	1,344.0	38.12	39.20
11-12	0	3	0	1,477.0	5.25	34.30	4	2	1	1,334.5	41.00	40.64
12-13	3	3	0	1,474.0	7.27	36.02	2	4	0	1,328.0	42.44	43.54
13-14	0	1	1	1,000.5	7.27	36.98	3	1	0	908.0	45.60	45.94
14-15	1	2	0	624.0	8.90	40.07	2	0	0	552.0	49.06	45.94
Totals	12	59	17				65	63	13			

* TB. = tuberculosis.

TABLE 5.—*Diagnostic Criteria* and Number of Deaths from Tuberculosis in BCG Vaccinated Persons and Controls*

	Pulmonary Tuberculosis		Miliary Tuberculosis		Tuberculous Meningitis		Pulmonary Tuberculosis and Meningitis		Tuberculous Peritonitis		Tuberculosis of Bones and Joints	
Diagnostic Criteria	BCG No.	Control No.	BCG No.	Control No.	BCG No.	Control No.	BCG No.	Control No.	BCG No.	Control No.	BCG No.	Control No.
X-ray pos. and sputum pos., for acid-fast bacilli	2†	15	0	8	0	0	1¶	0	0	0	0	0
X-ray pos., sputum neg., for acid-fast bacilli	2	3	0	0	0	0	0	0	0	0	0	0
X-ray pos., no laboratory examination	2‡	14	0	11§	0	0	0	0	0	0	1	2
X-ray pos., pleocytosis of spinal fluid	0	0	0	0	0	0	0	1	0	0	0	0
X-ray neg., lab. exam. pos., acid-fast bacilli	0	0	0	0	3‖	2	0	0	0	2¶	1	0
X-ray neg., no laboratory examination	0	0	0	0	0	2	0	0	0	1	0	0
X-ray neg., pleocytosis of spinal fluid	0	0	0	0	0	4	0	0	0	0	0	0
Total	6	32	0	19	3	8	1	1	0	3	2	2

* Pos. = positive. Neg. = negative.
† One died 24 hours postoperatively.
‡ One had a negative reaction to purified protein derivative of tuberculin one year after vaccination.
§ One was confirmed by autopsy.
‖ Two were confirmed by autopsy, one by positive postvaccinal Koch phenomenon.
¶ Koch phenomena after vaccination.

undergone similar tuberculous infection in the interval between the initial negative tuberculin reaction and the administration of isotonic sodium chloride solution.

INFLUENCE OF HYPERSENSITIVITY ON FATAL TUBERCULOSIS

The study afforded the unique opportunity of studying not only the epidemiology of tuberculosis but also the influence of hypersensitivity on the occurrence of fatal tuberculosis in a population known to be free from tuberculosis at the beginning of the study. The correlation of hypersensitivity with the different forms of fatal tuberculosis is presented for vaccinated persons and controls in table 6 and is related to the time of appearance of a positive tuberculin test.

Of the 32 controls who died from pulmonary tuberculosis, a total of 23 reacted to tuberculin, either during the year of death or in previous years. Six persons who previously had negative reactions to tuberculin had positive reactions during the year in which they died, while three persons had had negative reactions when tested three to six years previously. Of the 31 who died from the acute generalized forms of tuberculosis, such as miliary tuberculosis, tuberculous meningitis, tuberculous meningitis associated with pulmonary lesions, or tuberculous peritonitis, only 8 had reacted to tuberculin previous to and during the year of death, 8 reacted to tuberculin for the first time during the year in which they died, 4 were previously tuberculin negative and remained negative in the year they died, while 11 who were not tested within the year of death had previously failed to react to tuberculin. Although the numbers involved are relatively small, it is evident that the acute forms of tuberculosis occurred more frequently among those who had escaped a previous tuberculous infection, as indicated by a failure to react to tuberculin.

The relation of hypersensitivity to fatal tuberculosis is masked to some degree among the vaccinated. This is due to the hypersensitivity that follows BCG vaccination. This type of hypersensitivity differs, in general, from that following infection with virulent tubercle bacilli. The postvaccinal tuberculin reaction is characterized by a diffuse area of redness or pigmentation and slight edema, and in about 50% of cases the reaction is negative or doubtful to the first dose of tuberculin. In persons who have a tuberculous infection or a superimposed tuberculous infection following vaccination with BCG, a well-marked local inflammatory reaction follows intracutaneous injection of the first dose of tuberculin. The redness is more intense and the edema is sharply localized and indurated. The edematous area measures from 1 to 3 mm. in thickness. This type of reaction is often associated with a central area of blanching.

Of the six vaccinated persons who died from pulmonary tuberculosis, five had an increased hypersensitivity greater than that observed one year after vaccination at some time during the course of the study, and one showed a strong tuberculin reaction one year following vaccination. Of the three who died from meningitis, one has been mentioned previously as showing a Koch phenomenon 48 hours after vaccination and one reacted strongly to 0.00002 mg. of purified protein derivative one year after vaccination; the other was not tested during the year of death, but the postvaccinal tuberculin reactions in previous years were of the type induced by BCG vaccine. The person who died from pulmonary and meningeal tuberculosis reacted strongly to 0.00002 mg. of purified protein derivative one year postvaccinally; a Koch phenomenon had also been observed in this case 48 hours after vaccination. The two who died from tuberculosis of bones and joints showed an increased sensitivity to tuberculin. It is significant that while 19 of the 65 tuberculous

TABLE 6.—*Relationship of Different Types of Fatal Tuberculosis to Hypersensitivity in BCG Vaccinated Persons and Controls*

Reaction to Purified Protein Derivative	Pulmonary Tuberculosis		Miliary Tuberculosis		Tuberculous Meningitis		Pulmonary Tuberculosis and Meningitis		Tuberculous Peritonitis		Tuberculosis of Bones and Joints		Totals	
	BCG	Control	BCG	Control	BCG	Control	BCG	Control	BCG	Control	BCG	Control	BCG	Control
Pos. year of death and previously pos.	2	9	0	1	0	2	0	0	0	0	0	0	1	12
Not tested year of death and previously pos.	4	14	0	3	1	0	1	0	0	2	2	0	9	19
Pos. year of death, neg. previously	0	6	0	5	1	2	0	0	0	1	0	1	1	15
Neg. year of death, neg. previously	0	0	0	1	1	2	0	1	0	0	0	0	1	4
Not tested year of death, neg. previously	0	3	0	9	0	2	0	0	0	0	0	1	0	15
Total	6	32	0	19	3	8	1	1	0	3	2	2	12	65

TABLE 7.—*Number of Deaths from Tuberculosis and from Nontuberculous Causes in BCG Vaccinated Persons and Controls by Age and Sex in Five Year Periods*

Attained Age	Tuberculous				Nontuberculous			
	BCG		Controls		BCG		Controls	
	Males	Females	Males	Females	Males	Females	Males	Females
Under 5	1	0	1	0	3	7	4	7
5-9	0	0	1	4	5	2	8	5
10-14	1	2	4	10	6	4	6	6
15-19	1	2	10	16	11	6	8	5
20-24	1	2	8	10	4	7	9	3
25-29	2	0	0	1	2	2	0	2
Totals	6	6	24	41	31	28	35	28

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deaths among the controls were due to acute miliary or similar tuberculosis and three to tuberculous peritonitis, not a single instance of these forms of acute tuberculosis occurred among the vaccinated.

INFLUENCE OF SEX AND AGE ON FATAL TUBERCULOSIS

It is well recognized that the mortality rate from tuberculosis differs in males and females at different ages. Putnam [12] has analyzed statistically the mortality from tuberculosis according to sex over the period from 1870 to 1920. She found that the death rate from this disease was higher among females during the age period 5 to 24 years and that this difference was most marked at the age period 10 to 14, when three females to every male died from this disease. The number of deaths from tuberculosis among the vaccinated group is too small to be statistically significant. Among the controls it will be noted from table 7 that a significantly larger number of females than males died from tuberculosis during the attained age period of 5 to 19 years.

COMPARISON OF NONTUBERCULOUS DEATHS AMONG VACCINATED PERSONS AND CONTROLS

The significance of our observations dealing with the specific protective value of BCG vaccine is further emphasized by the comparability of the number of deaths from nontuberculous causes. A total of 59 of the 1,551 vaccinated persons and 63 of the 1,457 controls died from nontuberculous causes. On a basis of person years of observation the mortality rate is 2.77 and 3.17 per 1,000 person years of observation for the vaccinated and controls, respectively. Deaths from nontuberculous causes, both among vaccinated persons and controls (table 7), are comparable and show no selection by sex or age group. Among the 31 vaccinated males and 34 control males who died from nontuberculous causes, 16 and 19 deaths, respectively, were due to accidents or war injuries. Of the 28 vaccinated and 28 control females who died, 4 and 7 respectively died as a result of accidents. The deaths from nontuberculous causes are presented in table 8 and are correlated with the x-ray interpretation of the chest findings.

Of the 63 controls who died from nontuberculous causes, 40 or 63.5% failed to react to both 0.00002 and 0.005 mg. of purified protein derivative in previous tests; 12 or 19% reacted to 0.00002 mg., and 11 or 17.4% reacted to 0.005 mg. Of the 59 BCG vaccinated persons who died from nontuberculous causes, 11 had negative reactions on their initial prevaccinal test and died before they were retested, while of the remaining 48 persons, 25 or 52% reacted to 0.00002 mg. of purified protein derivative and 23 or 48% to 0.005 mg. The nature of the tuberculin reaction in the vaccinated was on the whole characteristic of the postvaccinal type of reaction.

The similarity of the number and distribution of deaths from nontuberculous causes by sex and age in the vaccinated and controls is a further indication that the sampling of the two groups 13 to 15 years previously was comparable, and that no intentional or unintentional bias has been introduced. A comparison of the deaths in both groups from tuberculous and nontuberculous causes indicates that the lower total death rate among the vaccinated group is due to the specific reduction of the tuberculosis rate.

DISCUSSION

The original objection to the use of BCG vaccine as an immunizing agent against tuberculosis was doubt as to the stability of the avirulence of the BCG culture. The claims of Petroff [13] that the BCG culture has regained its virulence was not confirmed by other investigators. One of us (J. D. A.) has conducted many different studies dealing with the virulence and antigenicity of the BCG culture from 1928 to the present time. During this period we have observed fluctuations in the tuberculogenic property and variations in some of the biological characteristics of the BCG culture, but at no time have we observed progressive tuberculosis in guinea pigs

TABLE 8.—*Number and Causes of Nontuberculous Deaths Among BCG Vaccinated Persons and Controls Correlated with Interpretation of Roentgenograms of Chest*

Diagnosis	X-Ray of Chest Negative		X-Ray of Chest with Nontubercuous Lesions	
	Vaccinated No.	Control No.	Vaccinated No.	Control No.
Accidents	19	22	1	6
Adenitis, cervical, acute	0	0	0	1
Agranulocytosis	1	0	0	0
Anemia, hemolytic	0	0	0	1
Brain abscess	1	0	0	0
Diabetes	1	0	0	0
Diphtheria	0	1	0	0
Embolism, post partum	1	0	0	0
Empyema	0	1	0	0
Encephalitis	0	1	0	1
Endocarditis	5	4	1	2
Enterocolitis	1	1	0	0
Goiter, toxic	0	1	0	0
Hepatitis, acute	0	0	0	1
Hemorrhage, post partum	0	1	0	0
Intestinal obstruction	0	1	0	0
Lymphosarcoma	1	0	0	0
Malnutrition	0	0	0	1
Meningitis, acute, nontuberculous	3	2	0	0
Myocarditis	1	0	0	0
Nephritis	0	1	0	0
Otitis media	0	0	1	0
Peritonitis, acute	2	2	0	1
Pneumonia, bronchial	2	1	2	1
Pneumonia, lobar	1	3	1	1
Poliomyelitis	1	0	1	0
Ruptured ectopic pregnancy	1	0	0	0
Shock, postoperative	2	2	0	0
Status epilepticus	1	0	0	0
Typhoid	0	1	0	0
Undiagnosed	2	1	1	1
Uremia	3	0	0	0
Totals	49	46	8	17

even when they were injected intraperitoneally with as much as 30 mg. moist weight of the culture. Although the studies of Vorwald [14] indicate that both the avirulent BCG and R_1 strains of the tubercle bacillus produce extensive pulmonary lesions in guinea pigs exposed over a long period of time to inhalations of silica dust, the cultures isolated from such lesions remain avirulent.

The much-quoted Lübeck tragedy, in which 73 of 251 infants vaccinated per os died from tuberculosis, cannot be used as an argument for increased virulence of the

12. Putnam, P.: Sex Differences in Pulmonary Tuberculosis Deaths, Am. J. Hyg. **7**: 663, 1927.

13. Petroff, S. A.: A New Analysis of the Value and Safety of Protective Immunization with BCG (Bacillus Calmette-Guérin), Am. Rev. Tuberc. **20**: 275, 1929.

14. Vorwald, A. J.; Dworski, M.; Pratt, P. C., and Delahant, A. B.: BCG Vaccination in Silicosis, Am. Rev. Tuberc. **62**: 455, 1950.

BCG strain. The evidence presented before the German court indicated that the deaths were not due to BCG vaccine, but to vaccine prepared from contaminated or accidentally substituted virulent culture used in the same laboratory.[15] The culture isolated from these infants proved to be a virulent, human-type tubercle bacillus known as the "Kiel strain." The identification of this culture was made by the German investigators on the basis of its virulence and on the fact that this culture produces a characteristic green color when grown in liquid medium.

If one were to assume that BCG vaccine does not increase resistance, that the vaccine contained virulent organisms or that its virulence increased in the body, then one might expect that its wide use throughout the world, in many instances among those living under the most adverse conditions, would have increased the mortality rate from tuberculosis. From all reports this has not happened. Speaking objectively, it appears from the experience and extensive investigations of those who have used BCG vaccine in the laboratory and in the field that there is no evidence, after 25 years of use, of any return of virulence of the BCG culture. In view of the intensive studies throughout the world and despite numerous reports dealing with the harmlessness of the BCG culture, it is surprising to read, "The amount of scientific work reported to prove its harmlessness in man is almost nil." [16]

The evaluation of the protective role of BCG vaccine against tuberculous reinfection is complicated by the decrease in the tuberculosis mortality rate since 1863. The rapid decrease in the tuberculosis death rate over the past 25 years is strikingly illustrated by the decrease in the mortality rate from tuberculous meningitis in New York City and Philadelphia. Between 1923 and 1949, inclusive, the rate for this disease decreased in New York from 5.8 per 100,000 to 1.0 per 100,000, while in Philadelphia it decreased from 7.1 per 100,000 to 1.2 per 100,000. This decrease occurred despite the fact that the proportion of nonwhite persons in these cities increased during this period.

Whatever the cause or causes of the decrease in the mortality from tuberculosis, it is obvious that mortality rates from one period cannot be compared with those of another to determine the value of BCG vaccine or any other control measure. Because of this, only controlled studies can provide objective data from which final conclusions may be drawn. Since there is no correlation between resistance to tuberculous reinfection and the titer of humoral antibodies, the value of BCG vaccine cannot be estimated by any of the usual serologic methods. In the absence of a more accurate yardstick, the development and persistence of hypersensitivity has been used as a measure of increased resistance, based on recognition that hypersensitivity and resistance show a close but not absolute relationship. This concept is supported by the observation of comparable vaccinated and control groups over a period of from 13 to 15 years. Mortality from tuberculosis among the BCG vaccinated, approximately 90% of whom showed persistent hypersensitivity for 11 years after vaccination, was significantly less than the tuberculosis mortality among the controls, whose incidence of hypersensitivity increased from 12 to 42% in the same period of time. Of special significance are our findings that the acute hematogenous forms of tuberculosis occurred with but few exceptions among the controls, many of whom had been tuberculin negative on the last test or within a year of death. The collected data from this controlled study fail to furnish any evidence to support the thesis that hypersensitivity favors the development of destructive forms of tuberculosis, even where the risk of tuberculous infection is high.

That the hypersensitivity resulting from BCG vaccination may mask hypersensitivity due to spontaneous infection with virulent tubercle bacilli is a valid objection to its general use, especially in areas where the incidence of tuberculous infection is low. Observations of tuberculin reactions in vaccinated and unvaccinated groups over a period of many years show that in general it is possible to differentiate between the tuberculin reaction following BCG vaccination and that following spontaneous infection with tubercle bacilli. In BCG vaccinated persons the level of sensitivity is low; approximately 50% react to 0.01 mg. of old tuberculin or to 0.00002 mg. of purified protein derivative, and the remainder will react to 0.1 mg. or 1.0 mg. of old tuberculin or to 0.005 mg. of purified protein derivative. It will be noted that in the vast majority of instances after 48 to 72 hours the local reaction appears as a diffuse red or reddish purple area, approximately 8 to 20 mm. in diameter, associated with slight and ill-defined edema or absence of any palpable edema. With increasing time the zone of reaction becomes purplish and persists for several weeks. The tuberculin reaction following spontaneous infection can be elicited in 80 to 90% of cases by intracutaneous injection of 0.01 mg. of old tuberculin or 0.00002 mg. of purified protein derivative. The reaction in these cases is characterized by a well-defined area of redness and a sharply defined elevated area of edema and induration, measuring 1 to 3 mm. in thickness, often associated with a central area of blanching, vesiculation, or necrosis.

SUMMARY AND CONCLUSIONS

The value of BCG vaccine in controlling tuberculosis was determined in a number of groups of Indians in the United States and Alaska. School and preschool age children, all of whom were negative to tuberculin, were placed by an alternate division of cards into one of two groups. These groups were comparable in numbers, age, and sex. The members of one group received a single intracutaneous injection of freshly prepared BCG vaccine and were not revaccinated during the study. The second group received an intracutaneous injection of isotonic sodium chloride solution and served as controls. Neither group was isolated before or after vaccination, and no change was made in their mode of living. Both groups were followed to the same degree annually for the first 9 to 11 years of the study by means of tuberculin tests and roentgenologic examination of the chest.

The mortality from all causes and from tuberculosis was determined 15 years after the study was initiated. The cause of death was based on roentgenologic and

15. Lübecker Tuberculose: Prozess, abstract of legal proceedings, Ztschr. f. Tuberk. **63**: 452, 1932.

16. Myers, J. A.: Immunity in Tuberculosis, J. A. M. A. **146**: 1492 (Aug. 18) 1951.

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laboratory examinations, clinical records, nurses' notes, and personal interviews with relatives in those few cases in which diagnosis had not been established. In no instance was the death certificate diagnosis accepted without further careful investigation. During the 13 to 15 years of observation a total of 71 vaccinated and 128 controls died from all causes. Among the 1,551 vaccinated persons observed for a total of 21,245.5 person years, 12 died from tuberculosis, a rate of 0.56 per thousand person years of observation. Among the 1,457 controls observed for a total of 19,520.5 person years, 65 died from tuberculosis, rates of 3.32 per thousand person years. Among the vaccinated persons and controls 59 and 63, respectively, died from nontuberculous causes, rates of 2.77 and 3.22 per thousand person years of observation, respectively. Of the 12 deaths from tuberculosis among the vaccinated group, 6 were due to pulmonary tuberculosis, 2 to bone and joint tuberculosis, 3 to tuberculous meningitis, and 1 to tuberculous meningitis and pulmonary tuberculosis. Among the 65 unvaccinated controls, 32 died from pulmonary tuberculosis, 2 from bone and joint tuberculosis, and a total of 31 from acute miliary or similar forms of tuberculosis, including tuberculous peritonitis. The tuberculin reactions of those controls dying from acute forms of tuberculosis were for the most part negative within the year of death or had become positive for the first time within that period.

The observed data over a period of 13 to 15 years support the concept that there is a close but not absolute relationship between resistance to reinfection and hypersensitivity. Hypersensitivity among the vaccinated, of whom 12 died from tuberculosis, ranged from 93.3% one year following vaccination to 90.2% 11 years later. Among the controls, 65 of whom died from tuberculosis, hypersensitivity increased from an incidence of 12.7% one year after the initiation of the study to 41.7% after 11 years.

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FURTHER STUDIES ON TULAREMIA IN THE OZARKS

REVIEW OF FORTY-FOUR CASES DURING A THREE-YEAR PERIOD

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In 1948 Bost, Percefull, and Leming [1] published a paper reviewing 54 cases of tularemia seen at this hospital, half of whom had been seen before streptomycin was available and half of whom had been treated with this antibiotic. The present paper is a study of 44 additional patients treated at this hospital during a three year period ending Dec. 31, 1950. A report of these cases may seem unimportant per se, but we feel that the ineffectiveness of aureomycin that we encountered should be brought to the attention of the medical profession.

Foshay,[2] who with Pasternack [3] first reported the successful clinical use of streptomycin in tularemia, has recently recommended streptomycin and dihydrostreptomycin as the drugs of choice, but he states that aureomycin appears to have been effective in a few cases of average severity. He adds that chloramphenicol (chloromycetin®) has been used experimentally and gives good indication that it may be valuable in this disease. E. S. Miller [5] is of the opinion that streptomycin is the drug of choice, but "that in a very limited clinical trial, aureomycin also appears to be an effective therapeutic agent for tularemia." He adds that whether aureomycin will have an advantage over streptomycin remains to be determined. Keefer and Hewitt [6] stated in 1948, "Streptomycin is, by universal agreement, the currently preferred agent for the treatment of tularemia." Yet Long [7] in a 1950 review of the antibiotics felt that in tularemia aureomycin is the drug of choice, with streptomycin second, and that the effect of chloramphenicol is yet unknown. Spink and Hall [8] speak only of streptomycin as a therapeutic agent and make no mention of aureomycin. On the other hand, Taylor,[9] in reporting 35 cases from the Army and Navy General Hospital in Hot Springs, Ark., leads the reader to believe that aureomycin is quite as effective as streptomycin in the treatment of this disease.

We concluded from our experience with aureomycin that it is every bit as effective in securing remissions as streptomycin or dihydrostreptomysin but that its curative effect cannot compare with that of the other two antibiotics. This experience has been largely responsible for the preparation of this paper. It is of interest that 8 of our 44 patients had very satisfactory remissions following courses of aureomycin with dosage ranging from 8 gm.

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Reviewed in the Veterans Administration and published with the approval of the Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Administration.

1. Bost, R. B.; Percefull, S. C., and Leming, H. E.: Tularemia in Ozarks Region, J. A. M. A. **137**: 352 (May 22) 1948.

2. Foshay, L., in Conn, H. F.: Current Therapy, Philadelphia, W. B. Saunders Company, 1950. Foshay, L., in Kyser, F. A.: Therapeutics in Internal Medicine, New York, Thos. Nelson & Sons, 1950.

3. Foshay, L., and Pasternack, A. B.: Streptomycin Treatment of Tularemia, J. A. M. A. **130**: 393 (Feb. 16) 1946.

4. Deleted on proof.

5. Miller, E. S., in Harrison, T. R., and others: Principles of Internal Medicine, New York, The Blakiston Company, 1950.

6. Keefer, C. S., and Hewitt, W. L.: The Therapeutic Value of Streptomycin: A Study of 3,000 Cases, Ann Arbor, Mich., Edwards Brothers, Inc., 1948, pp. 165-171.

7. Long, P. H.: Clinical Use of Antibiotics, M. Clin. North America, pp. 307-318, 1950.

8. Spink, W. W., and Hall, W. H.: Streptomycin, in Watson, C. J.: Outlines of Internal Medicine, ed. 6, Dubuque, Iowa, William C. Brown Company, 1949.

9. Taylor, R. R.: Report on Tularemia: Its Diagnosis and Treatment, J. Arkansas M. Soc. **47**: 47, 1950.

in four days to 12 gm. in six days. Seven of these returned to the hospital in from five to nine days with exacerbations, including chills and fever. Only one did not return, and he had had 15 gm. in 10 days. One patient received both aureomycin and chloramphenicol and had a satisfactory cure. Two patients had remissions with penicillin, but recrudescences necessitated short courses of dihydrostreptomycin, which resulted in cure. Since seven additional patients entered the hospital late in the course of the disease with almost no symptoms, the physician in charge judged that specific therapy was not indicated. All patients in this series who received either streptomycin or dihydrostreptomycin, whether initially or following remissions, were cured.

Of these cases, nearly all were farmers. Etiologically, in 28 cases the organisms were tick-borne; 7 cases were due to contact with rabbits, and 9 were of undetermined origin. Thirty-four were of the ulceroglandular type, five, pneumonic, four, combined ulceroglandular and pneumonic, and one, unclassified. The patient in the last case had a typhoidal course, and no localization of the disease could be made. The peak temperatures during hospitalization in this series ranged from 98 to 105.6 F, with an average of 101.8 F. Agglutinations occurred in dilutions ranging from 1:320 to 1:10,240, the latter titer being the highest used routinely in this hospital. In one patient, who had an apparent cure except that satellite glands remained enlarged, the agglutinations were followed in higher titers, and at one time the titer was 1:327,080.

The average dosage of streptomycin or dihydrostreptomycin was 6 gm. in six days. Keefer and Hewitt [6] believe that "the most cogent reason for administering only enough streptomycin to meet clinical requirements, especially in a disease with a low mortality rate of 7.4%,[10] is the well-documented knowledge that the smaller the total dosage, the fewer the significant toxic reactions."

Thirty-three of our cases occurred in May, June, July, and August. The duration of illness prior to admission ranged from 1 to 56 days, with an average of 12 days. It is of interest that patients in 1950 came for treatment in the first few days of illness, whereas in 1948 they had come only after several weeks. Word of the occurrence of tularemia has apparently spread to such an extent that the patients themselves or their families or friends quickly suspect what their trouble might be. Patients with the ulceroglandular type had their primary lesions in various areas, the scrotum, flank, or thigh (with inguinal node involvement) rating first, and chest or axillary folds (with axillary node involvement) rating second. Defervescence reactions with streptomycin, dihydrostreptomycin, or aureomycin were nearly identical in the ulceroglandular type, occurring in one to three days with an average of one and one-half days, while in the pneumonic type defervescence was much delayed.

Since this report includes only hospitalized patients, it represents simply a sampling of the total number of cases of tularemia. The Fayetteville Veterans Administration Hospital draws patients from sections of Kansas, Missouri, and Oklahoma as well as from Arkansas. The patients treated in this series came from the following counties: one each from Delaware and Latimer counties, Oklahoma; one each from Polk, Lawrence, Newton, Douglas, and Howell counties, Missouri; two from McDonald county, Missouri; six from Barry county, Missouri; one each from Carroll and Sabastian counties, Arkansas; two each from Baxter, Washington, Crawford, Franklin, and Johnson counties, Arkansas; four from Madison County, Arkansas; four from Polk County, Arkansas; and eight from Benton County, Arkansas.

The counties in this area from which no cases were reported may well have had many patients with tularemia, but, as in all public health problems, it is difficult to determine what happened to them. They may well have been adequately treated at home by their local physicians, have entered other hospitals, obtained nontherapeutic cure, or died. Indeed, many of our patients told us of similar illnesses among their families or neighbors.

One patient warrants special mention, because he typifies the common diagnostic pitfalls and because he underwent remission while receiving penicillin followed by recrudescence while still undergoing therapy with the same drug.

REPORT OF A CASE

L. B. H., a 41-year-old farmer, was readmitted to this hospital in April, 1950, for a postgastrectomy recheck. While he was traveling on the bus from his home some 60 to 70 mi. away,

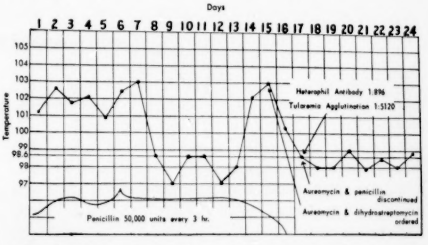

Chart showing course of patient in case reported. He had skinned a rabbit one week before admission.

chills and fever developed. On admission to the surgical service his temperature was 101.4 F. The accompanying chart tells the story graphically. Penicillin, 50,000 units every three hours, brought the temperature to normal on the 8th day, and it was not until the 14th day that it rose to 102.2 F. On the 15th day the temperature rose to 103 F, whereupon administration of aureomycin and dihydrostreptomycin was instituted in addition to the penicillin. On the 16th day a medical consultation was requested. The internist suspected infectious mononucleosis or tularemia.

The laboratory reports the following morning revealed a positive heterophil agglutination in a titer of 1:896 and a positive agglutination for tularemia in a titer of 1:5,120. The internist then discontinued administration of all antibiotics except dihydrostreptomycin, and recovery ensued. The patient was seen in January, 1951, at which time the agglutination for tularemia was 1:1,280. His heterophil agglutination was negative. We are of the opinion that his original positive heterophil agglutination was of the Forrsman type and that he did not have concomitant infectious mononucleosis.

SUMMARY AND CONCLUSIONS

Tularemia appears to be endemic in the Ozarks and in the majority of cases is tick-borne. It is stressed that streptomycin and dihydrostreptomycin are the drugs of

10. Francis, E.: Streptomycin in Treatment of Tularemia, Tr. A. Am. Physicians **60**: 181, 1947.

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choice in treatment of this disease. The present series plus the series of Bost and his colleagues [1] makes a total of 71 patients treated successfully at this hospital with these agents. Some of these patients were seriously ill. Seven of eight patients treated with aureomycin had prompt remissions, which were followed by recrudescences necessitating the use of streptomycin or dihydrostreptomycin.

CORONARY ARTERY DISEASE

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In this article I will use the terms "coronary artery disease," "angina pectoris," "coronary insufficiency," and "heart pain" interchangeably and synonymously. Angina pectoris can be manifested by almost any kind of pain and results from a disproportion between the oxygen demand and the oxygen supply of the myocardium. On this basis, many factors may operate in angina pectoris. It may be the result of: 1. Coronary sclerosis, coronary ostial closure, or inflammatory changes in the coronary arteries. 2. Chronic severe anemia or acute anemia, when the blood is unable to carry oxygen to the myocardium, or when the patient is suffering from chronic carbon monoxide poisoning. 3. A severe disease of the mitral or aortic valves, when the minute volume output of the heart cannot be maintained under exertion. Here the stroke volume is so decreased that, no matter how rapidly the rate may increase, the total output of blood per minute never reaches that needed for full coronary filling. 4. In cases of failure to maintain the mean aortic pressure, as well as a disturbance in the filling of the coronary arteries. This particular mechanism comes into play when the anginal syndrome is associated with aortic insufficiency and when the anginal syndrome is found in association with paroxysmal tachycardias or other rapid heart rates. 5. Cases in which there is a disproportion between the blood supply and the greatly hypertrophied heart muscle. It is obvious that many factors may be active in producing angina pectoris and that coronary artery disease itself may be minimal or even absent.

Heberden's original description of the onset of angina pectoris was sudden substernal pain associated with a constricted feeling around the chest, with distress radiating down the left arm and causing a feeling of impending death. If, however, the diagnosis of angina pectoris is to be limited to patients presenting that syndrome, many patients who have the disease will be overlooked. Many patients do not have pain underneath their sternum. Instead, they have a feeling of fulness, of there being a gas bubble present, a squeezing beneath their chest bone, fulness in the chest, and a burning sensation under the chest bone; or they may have no pain or distress, just an uncomfortable feeling. The radiation of the pain may also be confusing in that the pain may radiate to the left shoulder and stop there or to the left arm or the left forearm or finger tips. The pain, however, may not radiate to the left but up into the angle of the jaw or directly to the back, to the upper right quadrant of the abdomen, or to the epigastrium; and with this radiation, if associated with belching and dyspepsia, it is difficult to distinguish between gastrointestinal disease and coronary artery disease. Also, the somatic expression of the referred pain may be variable. The afferent fiber of the pain arc is the vagus, and the pain is referred out through the cervical sympathetic nerves to various portions of the body, thus precipitating the somatic effect produced by the coronary insufficiency. These patients, instead of having pain in the left arm and the other typical symptoms, may have a muscular phenomenon. This is the explanation of the severe, knife-like, constricting pain that occurs in these patients around the chest. It is due to spasm of the intercostal muscles. Often there is a vascular phenomenon, and, instead of pain occurring in the left arm, the fingers blanch and turn white, as in secondary Raynaud's disease. On the other hand, the reflex arc may affect the glandular system. These patients break out with severe sweating or salivation. It may be that the lumbar sympathetic nerves are stimulated and involved in referred pain, and the patient has a desire to defecate or to void. Often a painless variant occurs at night, namely, paroxysmal nocturnal dyspnea, which represents an attack of coronary insufficiency. Furthermore, there may be absolutely no pain in the chest itself, and the only distress occurs at the point of ordinary pain reference. A patient may have pain limited to the epigastrium or the upper right quadrant of the abdomen and have absolutely no pain beneath the chest itself. Sometimes the patient has pain in the left wrist, blanching of his fingers, a heavy feeling across his shoulders, or a heavy feeling in his arms, and yet he has no pain underneath the breast plate.Then again, the patient may have pain without pain; that is, he may have all of the characteristic signs and symptoms of suffering, yet cannot tell you why, other than that he has a definite feeling of weakness. This great variation in the pattern of coronary artery disease symptoms frequently makes the diagnosis of the disease difficult. One can, however, make the diagnosis in these patients if one remembers that, regardless of the type of distress and regardless of where it occurs, it is always the result of either physical exertion or an emotional upset. The emotional upset that occurs may be of a pleasant nature, or it may be one associated with emotional distress and grief, but in either case it may precipitate coronary pain.

Angina pectoris may occur at any age. It has been known to be present in infants, but the frequency increases with advancing years. It is a disease of both sexes, commoner in men than in women, and it produces more distress in men than in women. It is a disease that affects all economic levels. There is no good evidence to demonstrate racial differences in angina pectoris nor to indicate any relationship between coronary disease and diet or

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between the development of angina pectoris and a patient's occupation. It is true, however, that once the patient has had angina pectoris, it is obvious that if his occupation entails severe exposure to cold, climatic changes, emotional upsets, or unusual physical exertion, he will have more anginal seizures than the person who leads a sedentary type of life.

The disease varies with the seasons. During cold weather there is a greater increase in anginal seizures than during warm weather. All of these factors play a role in the diagnosis of the disease. It is not known why angina pectoris varies from day to day. It is not known why a man may carry on a very active life without any signs of precordial pain and then, when someone angers him, be seized with a violent attack of angina pectoris. Nor is it known yet what the mechanism is that causes severe recurring attacks of angina pectoris during cold or windy days. Some patients may carry on an active life but on smoking a cigarette and then exerting themselves are immediately seized with an anginal attack. Some patients may do anything they desire on an empty stomach, but, if they eat a small amount of food and then attempt to exercise, they will be seized with an attack of angina. There are so many modifications of the pain, so many modifications of the factors that produce the pain, and so many day to day changes in the pain that it is often very difficult and confusing to evaluate the pain, unless one remembers the one single and common denominator, namely, that distress follows exertion or emotional excitement.

For the diagnosis of angina pectoris a physician should take a careful and detailed history. A thorough physical examination should be made, with inspection of all orifices of the body. Seldom does the physical examination, itself, give any clue to coronary pain, but extracardiac factors or cardiac factors that may precipitate coronary pain may be found. Examination should include a hemoglobin estimate, white blood cell count, urinalysis, sedimentation rate, and a differential blood cell count. A blood Wassermann test should be taken and a Mantoux test applied. A 6 ft. chest plate should be taken as well as an electrocardiogram. There are no physical findings pathognomonic of angina pectoris, nor are there any laboratory findings diagnostic of this disease. The electrocardiographic tracing may show many abnormalities, which may be caused by conditions other than the coronary artery disease itself. In fact, one may find an electrocardiographic pattern suggesting severe myocardial damage, although the patient has no clinical signs of heart disease and no evidence of angina pectoris. On the other hand, the patient with severe angina pectoris, usually diagnosed clinically, may have a perfectly normal electrocardiographic tracing. The two step Master test and the oxygen deprivation test, in which the amount of oxygen in the circulating blood is decreased through the inhalation of gas mixtures, may produce changes in the electrocardiographic pattern, showing that there is myocardial anoxemia. This, again, does not diagnose angina pectoris. This is a clinical entity. The diagnosis is made by the patient telling of his pain, what happens with it, and where it goes. Here, again, the electrocardiographic findings may suggest coronary disease, although the patient has absolutely no pain clinically. Again, patients with severe attacks of angina pectoris may pass both the Master test and the oxygen deprivation test with great ease. The chest x-ray examination, of course, does not in itself diagnose coronary artery disease; however, with new techniques one may occasionally demonstrate coronary sclerosis on the film. The presence of coronary sclerosis does not in itself mean that the patient has coronary insufficiency, for he may have widely patent coronary vessels even if they are sclerosed, or he may have rich anastomotic circulations that bring about an ample blood supply to the myocardium. Here, again, the demonstration of disease on the x-ray film does not mean that the patient has angina pectoris; it simply signifies that he has coronary artery sclerosis. The diagnosis must depend on the history, namely, that the patient experiences distress of some kind somewhere about the body that is related to physical exertion or emotional excitement. It is always well in these persons to make a complete gastrointestinal investigation, for the nerve supply to the upper abdomen and the gastrointestinal tract is essentially the same nerve supply that affects the heart; the disease in one structure may precipitate attacks in the other structure, and many patients may be cured of their anginal seizures for a long period of time by the treatment of a peptic ulcer or the removal of a diseased gallbladder.

The treatment of angina pectoris is, first of all, the treatment of any associated or underlying disease. There is no need of dietary management in these patients, unless they are diabetic or obese. If they are diabetic, it is well not to keep them completely sugar-free, as this increases the number of anginal attacks. There is no medication for the treatment of angina pectoris except glyceryl trinitrate (nitroglycerin). The patient is taught to take this whenever the pain occurs, and he is taught how to use it prophylactically whenever an act he does may precipitate an attack of pain. The patient is not limited in his activities; he may do anything he wants to do that will not cause pain. The reason for this is that the collateral circulation is best established when there is a demand for it. There is no reason to limit patients with angina pectoris to sedentary lives. They are taught simply how to live within the pain limits produced by their disease. Congestive heart failure may develop in persons with angina pectoris, and, if this occurs, the patient should be treated as any other patient would be treated for congestive failure. The blood supply to the heart is by the coronary arteries, right and left, and, although they may act as end arteries, there are rich anastomoses between the two vessels. There is some evidence now to indicate that there is a third coronary artery arising on the right side. If it arises sufficiently high, it is a rich source of anastomoses between the various coronary arteries. The coronary arteries, as they become sclerosed, produce increasing anastomoses, so that it is possible to have a rich blood supply despite the presence of rather severe coronary artery disease. Some physicians believe that collateral circulation may occur through the thebesian vessels and the venous sinuses. All of the sources for collateral circulation have not been well established or authenticated. A myocardial infarction will not develop in a patient who has severe coronary artery disease and suddenly has a coronary thrombosis, if he has a rich collateral circulation. But if the patient

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has coronary thrombosis and the collateral circulation is rather poor, there would be no blood flow to the area supplied by the artery, and ischemic necrosis would take place, which is a myocardial infarct. In severe coronary artery disease, prolonged coronary insufficiency associated with exertion may be of such an extent that the decreased oxygen supply to the heart muscle will produce a necrosis within the heart muscle, and this necrosis, or infarction, then occurs without coronary thrombosis. When coronary thrombosis develops in a patient, he is seized with severe constrictive chest pain, he breaks out with a cold sweat, he goes into shock, his blood pressure falls, his pulse becomes very rapid and weak, and he becomes acutely ill. If this occurs without a myocardial infarction, after a few hours the entire picture disappears and the patient is quite well and apparently none the worse for the seizure. If, on the other hand, a myocardial infarction occurs, there is, in addition, an elevation of temperature, increase in the white blood cell count, increase in the sedimentation rate, usually a pericardial friction rub, urobilinogen in the urine, and electrocardiographic tracings that are diagnostic. The same is true of the patient who has the myocardial infarction without a coronary thrombosis. Here the pain pattern is not quite so severe, but otherwise the picture is exactly the same as that of the patient who has had a coronary thrombosis with infarction. A coronary thrombosis, with or without an infarction, differs from angina pectoris in that there may be no relationship to exertion, whereas angina is related to exertion. The patient with angina pectoris tends to be quiet, whereas the patient with coronary thrombosis is apprehensive and thrashes about to some extent. The blood pressure rises in angina pectoris and falls in coronary thrombosis with infarction. The pulse becomes rapid in angina pectoris and becomes weak in coronary thrombosis. The patient with angina pectoris does not have the profound shock appearance, nor does he run a fever. He does not have the elevated white blood cell count or the elevated sedimentation rate. He does not have a pericardial friction rub, and he does not have urobilinogen in the urine. The electrocardiogram shows very temporary or no changes.

Once the patient sustains a myocardial infarction with a coronary thrombosis, he is put to bed, given oxygen, 1/4 grain (15 mg.) morphine sulfate, with 1/150 grain (0.12 mg.) atropine sulfate as needed until he is sedated. If he has thromboembolic phenomena immediately, he is given heparin and bishydroxycoumarin (dicumarol®) simultaneously, with administration of heparin being stopped on the third day but with administration of bishydroxycoumarin continuing thereafter. The patient receives in addition a 1,200 calory soft diet, his bowels are kept open with "petro-syllium," he is allowed to use a commode, and he is catheterized, if necessary. Should the patient show congestive heart failure, he is digitalized and treated with mercurial diuretics. He remains in bed until all signs and symptoms of the infarction have disappeared; namely, until clinical and physical signs have disappeared, the electrocardiographic tracings remain stationary, the sedimentation rate is normal, and the white blood cell count is normal. The patient is then permitted to get out of bed and is given graduated exercises. He returns to work when there is no evidence of any active heart disease. He is permitted to return to any and all activity, depending on whether he has congestive failure or whether he has angina. The patient's activities are limited to the physical limitation of his disease following the coronary thrombosis.

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SUMMARY

Angina pectoris may be manifested as almost any kind of pain and results from a disproportion between the oxygen requirement and the oxygen supply to the heart muscle. It may be the result of some disease within the heart or the coronary arteries, of the inability of the blood to carry oxygen to the heart, of some disturbance in the minute volume output of the heart such as found in valvular heart disease, of a fall in the mean aortic blood pressure as seen in paroxysmal tachycardia and aortic insufficiency, or of a disproportion between the muscle bulk of the heart and the blood vessels supplying the muscle. The pain or distress is variable and may mimic other forms of chest pain or chest diseases. It has, however, the following pattern that is the common denominator for making the diagnosis, namely, that the pain follows or is associated with physical exertion or emotional excitement and that it is relieved by rest and glyceryl trinitrate (nitroglycerin). In the patients with angina pectoris the diagnosis must be made entirely by history. There are no pathognomonic signs nor pathognomonic laboratory tests to establish the diagnosis. In some of these patients a coronary thrombosis will develop with or without myocardial infarction, or an infarction may develop alone. When this occurs, the patient must be kept in bed. He must receive morphine sulfate in adequate doses and oxygen if needed. He must be placed on a bland diet. Anticoagulants are used if necessary, so that the prothrombin activity is about 20 to 30% of normal. He is digitalized, and mercurial diuretics are used as needed. The patient remains at rest until all signs and symptoms of the infarction disappear. He then does graduated exercises and returns to his activities. Should he have anginal pain, limitation of his activities is governed by the pain. He may do anything he wishes that does not produce the pain. He is taught to use glyceryl trinitrate dissolved under the tongue, 1/200 grain (0.3 mg.) when required to relieve the pain and to use it prophylactically, if necessary, when he knows the coming events will precipitate an attack of pain. Those persons who have paroxysmal nocturnal dyspnea, which is a variant of angina, may be treated by using prophylactically one of the mercurial diuretics once or twice a week, injecting 1 or 2 cc. intramuscularly. In the patient who has postprandial pain we find that the addition of phenobarbital sodium, ½ grain (30 mg.), plus atropine sulfate, 1/150 grain (0.4 mg.), to sodium bicarbonate (Sippy powder) taken three times a day after meals will often relieve the attacks of pain. Finally, it is important in this disease to pay more attention to what you hear from the patient than what you hear through a stethoscope and more attention to what you see in the patient than to what you see in an electrocardiogram.

350 St. Peter St.

CLOSED FOSSA TONSILLECTOMY

A METHOD FOR REDUCING POSTOPERATIVE BLEEDING

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The literature contains an enormous amount of material dealing with hemorrhage occurring after tonsillectomy. All aspects of the problem have been investigated from the strictly postoperative point of view, with some improvement in the situation. Yet each year fatal and nearly fatal hemorrhages continue to occur. In the past, these hemorrhages have been attributed to changes in barometric pressure, presence of infection, the menstrual period, salicylates, blood dyscrasia, blood pressure, and many other causes, including even the season of the year. It is the purpose of this paper to show, on the basis of anatomical study and experience in 634 cases, that such hemorrhages are unnecessary if the techniques of modern surgery, long neglected by otolaryngologists, are applied to the problem. It is postulated that such hemorrhages are due to none of the causes mentioned but rather to a hole in a blood vessel, as is the case elsewhere in the body. Such hemorrhages can be prevented by proper closure of the wound and well-selected antibiotic therapy.

ANATOMY

The main vessels entering and leaving the tonsil fossa have been adequately described elsewhere; however, the actual distribution of the blood vessels in the tonsil fossa has not received proper emphasis. Many surgeons who do dissection tonsillectomies are probably vaguely aware that the vessels enter the fossa and that the larger ones sometimes continue for some distance up and down the floor of the fossa. In order to ascertain more exactly the distribution of these vessels, dissections were done on several head and neck preparations, the veins and arteries of which had been filled with brightly colored plastic dye. These dissections were carefully done on reasonably fresh material. It was observed that only occasionally does a vessel of any size enter the tonsil directly from the floor of the fossa. The larger vessels, as they enter the fossa, enter directly into an anastomosis, which, as the tonsil is dissected away, is seen to lie on the superficial layers of the fascia and muscle forming the floor of the fossa. The network of vessels runs lengthwise in the fossa. The branches from the anastomotic network entering the tonsil proper are very small. Those entering the pillars of the fossa are of capillary size, a fact that makes it possible to close the fossa without including the pillars, thus obtaining a normal looking throat and still, with properly placed sutures, preventing postoperative hemorrhage entirely or at least rendering it as controllable as it is in any well-handled surgical wound.

TECHNIQUE

The operative procedure, depending as it does on the application of good surgical dissection, of necessity eliminates the use of many of the older types of instruments, such as Beck or Nesbit snares or the tonsillotomes of the Sauer, Daniel, or LaForce techniques, to avoid leaving tonsil tissues in place, especially near the lower pole. The anesthesia of choice is ether given through a Davis-Crowe or McIvor gag with the patient in a modified Rose position, thus eliminating, as nearly as possible, pulmonary complications (in this series there were none), yet attaining maximum visibility of the tonsil region. Local anesthesia may be used, but the inability of the patient to hold his mouth open wide enough and quiet enough for good suturing makes the job difficult.

Once the gag is in place, the tonsil is grasped with a tenaculum, and an incision is made through the mucous membrane at the upper pole on the anterior pillar. This is widened by blunt dissection with scissors until there is room enough for insertion of a pillar retractor, at which point the scissors are replaced by a blunt dissector; this latter step eliminates any desire on the part of the operator to hurry his dissection using a slightly open scissors. This is important if no tags are to be left behind. Blunt dissection is carried through to the lower pole. Then, and only then, a snare is used, the tonsil root being strongly pulled medially; a cold wire snare of the Tydings type is used to remove the tonsillar extensions into the tongue. If the operator prefers, complete removal of the tonsil may be accomplished by dissection alone. After removal of the first tonsil, the fossa may be packed and the same procedure carried out on the opposite side; however, there is no objection to sewing up the fossa directly, and if bleeding is rather profuse, especially in a child, it is the procedure of choice.

Suturing is usually but not necessarily begun at the lower pole. On consideration of the anatomy involved it becomes apparent that the sutures must enter at the point where the tonsillar pillar joins the true floor of the fossa. Usually this is more easily done at the point where the posterior pillar meets the floor of the fossa. The needle is then passed under the true floor of the fossa and is brought out as near to the junction of the anterior pillar and fossa as possible. The suture is then tied. If the surgeon prefers, four or five interrupted sutures will usually give a clean even closure, with no undue tension on the pillars (*B*, *C*, and *D* in accompanying figure).

The choice of the suturing technique will vary with the surgeon; some will prefer interrupted sutures, others perhaps two to three figure-of-eight sutures, and still others a continuous suture. I usually use two to three sutures on each side of the throat, tying each as the ligature is placed, thus offering an opportunity to place each new stitch in the immediate proximity of any brisk bleeding. It should be borne in mind that the floor of the fossa should be tented up with a clamp to allow a maximum amount of room between the floor of the fossa and the structures beneath. Over a period of six years, I have done 634 tonsillectomies in all of which the fossa was closed in the manner described. The patients were of all ages, and 308 were males and 326 were females (see table).

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COMMENT

I realize that the material in this paper constitutes a break with the traditions of tonsil surgery and will, therefore, be controversial. Certain questions and criticisms have already been voiced by my immediate associates. It seems to me, for this reason, that a brief discussion of these matters is appropriate.

Operation.—The average time required to complete the operation and the suturing is about thirty minutes for an adult and twenty minutes for a child. It has been asked if this is not an unnecessary prolongation of anesthesia; however, in these days of modern surgery and anesthesia, in which chest surgeons and brain surgeons operate for four to eight hours without ill effects on the patient, this seems to be an unnecessary worry. More important still, if the need for a secondary anesthesia to control hemorrhage can be prevented, then the extra time is more than justified. I use plain "0" catgut for suturing, but the choice is largely up to the surgeon.

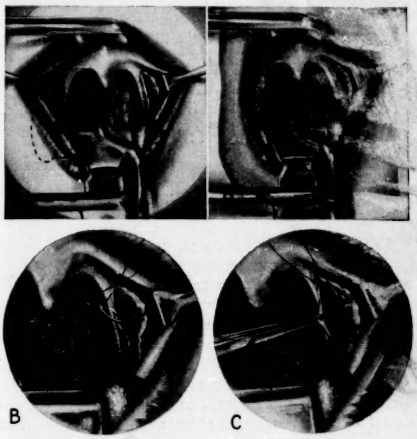
Postoperative Course.—The postoperative course is shortened, as might be expected, because the size of the area left to heal is greatly reduced (*A* in figure). Children more often than not eat fair sized breakfasts the morning after the operation. The ease of swallowing tends to make the postoperative febrile period shorter and the fever reported minimal, since these patients do not tend to dehydrate as much as those in whom the fossa is left wide open. The average child's throat heals by the end of five days, and most adult patients can be back at work by the end of a week. Nausea and vomiting are reduced to a minimum, because, with the wound closed, there is no ooze of blood to be swallowed.

Age Distribution of 634 Patients Treated by Closed Fossa Tonsillectomy

Age, Yr.	No. of Patients
Birth to 3	67
4- 5	190
6-10	154
11-15	33
16-20	52
21-30	83
31-40	22
41-50	22
51-60	11
Total	634

The question has been raised as to the danger from buried tonsil tags. If the tonsil is removed by careful blunt dissection by a competent surgeon, the number of remnants of tonsil tissue should be minimal. In the six years that this work has been in progress there have been no complications of this sort. If care is exercised in placing the sutures so that there is no undue tension placed on the posterior pillar, the voice is not affected by the closed fossa technique. In the group of cases reported there were seven professional singers, and all seven reported no damage to the voice. In this series there were no pulmonary complications. If sufficient care is exercised in positioning the patient on the operating table and if proper use of the suction is made during the operation, there should be none. The need for sedation is considerably reduced in both children and adults. This in itself tends to minimize pulmonary complications.

Except in the case of accidents, no hemorrhage should occur. In this series there were two cases of hemorrhage caused by accident. One occurred in a 65-year-old man who jammed his lower dental plate into the right tonsil fossa and tore out the sutures. The other occurred in a 7-year-old girl who, on the third postoperative day, slipped away from her mother to go swimming and, in diving off the high diving tower, landed with her mouth open and tore out the sutures on the right side. The so-called late bleeders do not occur, simply because, with the fossa closed, the bed of granulations from which these hemorrhages arise does not form; in other words, the wound heals by primary intention. The closed fossa technique does not, of course, eliminate the possibility of bleeding from the adenoid bed in cases in which both tonsils and adenoids have been removed. In this series there were four cases of such bleeding; two were severe enough to warrant transfusions. With the closed fossa technique there should be no fatalities from hemorrhage, once the operative procedure has been mastered. There were none in this series. I would like to point out, however, that this is a very real risk in the older methods of tonsillectomy. While it is practically impossible to obtain accurate figures on this problem, it is apparent from the few figures available that in any large city the number of deaths due to postoperative hemorrhage is nearly comparable to the number due to poliomyelitis.



A, tonsil fossa open (left) and closed with sutures (right). Dotted lines indicate relative extent of raw surface left to heal by the two techniques. *B*, interrupted suture technique for closing tonsil fossa. Needle begins at junction of the posterior pillar and fossa proper, passes just beneath the vessels, and emerges at the junction of the anterior pillar and the floor of the fossa. *C*, continuous suture technique for closing tonsil fossa. *D*, tonsil fossa closed with interrupted sutures; note that pillars are not included in the closure.

With the throat at rest, the fossa from which a tonsil has been recently removed becomes a dead space. General surgeons, for years, have preached the precept that such dead spaces should, if possible, be closed. The closed fossa technique satisfies this precept, and healing is therefore more rapid. Surgeons have learned to close the

wound in pilonidal cyst cases rather than wait through the long process of letting the wound fill in by granulation; the same principle applies in the case of the tonsil fossa.

Postoperative infection has been no problem in this series. No drugs were given in any of the cases until 1951. Because of a mild flu epidemic during the spring of 1951, all patients were given 300,000 units of procaine penicillin G on the day of and the day after the operation as a prophylactic measure. It was found that this medication tended to result in a much cleaner throat, and, by minimizing the number of Vincent's organisms present, the postoperative foul breath of the tonsillectomy patient could be practically eliminated. For this reason, penicillin has been given in succeeding cases. Patients were advised against the use of acetylsalicylic acid in any form; however, the use of the drug in gum has become so much of a habit with the lay public that a large number of patients did use it. Vitamin K was routinely given to combat the effects of the unknown quantity of the drug that was ingested. With the tonsil wound closed, no hemorrhages resulted.

SUMMARY AND CONCLUSIONS

1. A method for closure of the tonsil wound that is based on the anatomy involved and on recognized surgical precepts is described. This method prevents hemorrhage after tonsillectomy in all cases except those in which an actual accident occurs. The success of the closed fossa technique depends on the ability of the operator to do a clean dissection of the tonsil. This technique automatically eliminates the need for instruments of the guillotine techniques.

2. The danger of hemorrhage and its emotional impact on both the patient and his family can and must be eliminated. With the introduction of the closed fossa tonsillectomy technique, the patient has a right to expect and obtain surgical treatment performed in a manner that satisfies the fundamental precepts of good surgery. The physician can confidently reassure his patients concerning hemorrhage, and he should look askance on the occurrence of postoperative hemorrhage, barring the occasional case caused by accident.

26 Strathallan Park.

PHYSIOLOGICAL OPERATION FOR IDIOPATHIC CONGENITAL MEGACOLON (HIRSCHSPRUNG'S DISEASE)

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The striking clinical features, the unique pathological findings, and the evasiveness of the etiological factors have made idiopathic congenital megacolon (Hirschsprung's disease) a provocative and stimulating enigma. Recent observations by Whitehouse and Kernohan [1] and Swenson and co-workers [2] have resulted in a better understanding of the pathogenesis of this disease and have permitted a more rational approach to its treatment. The purpose of this paper is to discuss our experiences with 15 patients in whom colonic function was studied by means of fluoroscopy and roentgenograms, after the administration of a barium enema. As a result of these studies, a new surgical approach to the treatment of Hirschsprung's disease, which has given excellent results in the patients so treated, was devised.

From the Department of Surgery of the University of Minnesota Hospitals.

Several illustrations and an additional case report have been omitted from THE JOURNAL and will appear in the author's reprints.

1. Whitehouse, F. R., and Kernohan, J. W.: The Myenteric Plexus in Congenital Megacolon: Study of 11 Cases, Arch. Int. Med. **82**: 75 (July) 1948.

2. Swenson, O.; Neuhauser, E. B. D., and Pickett, E. K.: New Concepts of Etiology, Diagnosis and Treatment of Congenital Megacolon (Hirschsprung's Disease), Pediatrics **4**: 201, 1949.

3. Hirschsprung, H.: Stuhlträgheit Neugeborner in Falge von Dilatation and Hypertrophie des Colons, Jahrb. f. Kinderh. **27**: 1, 1887.

4. Perthes, G.: Zur Pathologie und Therapie der Hirschsprung's chen Krankheit, Arch. f. Klin. Chir. **77**: 1, 1905.

5. Concetti, L.: Ueber einige Angeborene, bei Kindern die habituelle Verstopfung hervorrufenden Missbildungen des Colon, Arch. F. Kinderh. **27**: 319, 1899.

6. Bartle, H. J.: Megacolon: Ramisection Proposed as a Form of Treatment, Amer. J. M. Sc. **171**: 67, 1926.

7. Marfan: De la constipation des nourrissons et en particulier de la constipation d'origine congenitale, Rev. mens. d. mal. de l'enf. **13**: 153, 1895.

8. Dalla Valle, A.: Ricerche istologiche su di un caso di megacolon congenito, Pediatria **28**: 740, 1920.

9. Dalla Valle, A.: Contributo alla, conoscenza della forma famigliare del mega colon congenito, Pediatria **32**: 569, 1924.

10. Cameron, J. A. M.: On Aetiology of Hirschsprung's Disease, Arch. Dis. Childhood **3**: 210 (Aug.) 1928.

11. Robertson, H. E., and Kernohan, J. W.: The Myenteric Plexus in Congenital Megacolon, Proc. Staff Meet., Mayo Clin. **13**: 123, 1938.

12. Tiffin, M. E.; Chandler, L. R., and Faber, H. K.: Localized Absence of Ganglion Cells of Myenteric Plexus in Congenital Megacolon, Am. J. Dis. Child. **59**: 1071, 1940.

ETIOLOGY

Since Hirschsprung's report before the Berlin Congress for Children's Diseases, in 1886,[3] many theories as to the cause of this disease have been advanced. For the most part, these theories have postulated the presence of some obstructing mechanism, such as valves,[4] localized aplasia,[5] torsion of the bowel,[6] or kinking [7]; however, careful study has failed to reveal any obturating mechanism other than the fecal contents within the lumen of the colon. The possibility that alterations of the ganglion cells of the myenteric plexus play an important role in the genesis of Hirschsprung's disease was first suggested by the studies of Dalla Valle, in 1920 [8] and 1924.[9] He found the ganglion cells of the myenteric plexuses normal in appearance and number in the cecum and the ascending, transverse, and descending colon, but, in more than 100 sections of the sigmoid colon, no nerve cells were found. Similar findings were reported by Cameron,[10] Robertson and Kernohan,[11] and Tiffin, Chandler, and Faber.[12] In 1948, Whitehouse and Kernohan [1] published the results of their study of 11 cases of congenital megacolon and 5 cases of secondary megacolon. The ganglion cells were absent in the myenteric plexuses in the most distal portions of the colon in all patients with true congenital megacolon. The authors postulated the existence of a functional obstruction at the level of the absence of ganglion cells, with secondary dilatation and hypertro-

phy of the proximal colon. By means of colonic motility studies with use of a multiple balloon technique, Swenson and his co-workers [13] presented evidence supporting the concept of faulty transmission of peristaltic waves across a narrow rectosigmoidal area and, in addition, thought that the rectum was abnormal in its behavior. As a result of these studies, Swenson advocated the removal of the rectosigmoid and almost the entire rectum, with anastomosis of the sigmoid colon to a small residual section of the rectum immediately above the internal sphincter by a pull-through technique.[14] In the group of 52 patients in whom this technique was used, there was only one postoperative death; the other patients were apparently cured. Bodian and co-workers [15] and Hiatt,[16] utilizing slight variations of Swenson's procedures, also reported good results. Hiatt, however, stated that there were leaks at the anastomosis in 7 of the 22 patients, and, in some patients, there was impairment of sphincter action, as well as recurrences of bowel dilation and symptoms of megacolon.

FUNCTIONAL ACTIVITY OF BOWEL AS DETERMINED BY ROENTGENOGRAMS

Neuhauser [2] reemphasized the important roentgen findings in patients with congenital megacolon. By injecting only a small amount of barium, with examination of the patient in an oblique position, he clearly demonstrated a narrow segment of colon interposed between the rectum and the dilated sigmoid in all patients with true congenital megacolon. Roentgen studies of our patients have confirmed Neuhauser's findings, and, in addition, we have noted the following facts (fig. 1). 1. The rectum has a normal caliber. 2. The right side of the colon, that is, the cecum, the ascending colon, and variable extents of the transverse colon show good haustral markings and evidence of normal contractility. 3. The left side of the colon, i. e., the descending and sigmoid colon, are markedly dilated and show no evidence of haustral markings or peristaltic activity. These three points are extremely important. They have governed the extent of colonic resection in our patients. The portions of the colon that are dilated and show no peristaltic activity roentgenographically are removed. The rectum is retained, and an anastomosis between it and the right side of the transverse or ascending colon, which shows good peristaltic activity roentgenographically, is carried out.

OPERATIVE PROCEDURES

Since these patients had suffered many years of chronic ill health, their nutritional status was impaired, and special attention was directed toward getting them in the best possible condition for operation. They received high caloric diets, with vitamin supplements, and, if indicated, repeated whole blood and plasma transfusions were given to elevate the plasma protein level. It was important to take as much time as necessary to clean out the colon completely, preoperatively, and this sometimes took many days. For three days prior to operation, the patient was given aureomycin hydrochloride, 500 mg. four times a day orally, in order to decrease the intestinal bacterial flora. An intravenous solution of 5% glucose in distilled water was injected into the arm before operation, and, since it has been shown that many of these patients have idiopathic dilatation of the urinary bladder, all patients had an urethral catheter inserted immediately after being anesthetized. The anesthetic used was a thiopental (pentothal®)-curare solution in all the patients except one, in whom a spinal anesthetic, supplemented with a thiopental sodium-curare solution, was used.

A left paramedian incision was made from the symphysis pubis well up into the epigastrium (fig. 2*A*). In our first two patients, the "hockey stick" incision was used, because some difficulty in mobilizing the splenic flexure was anticipated, but, in this group and in subsequent patients, it was noted that the splenic flexure was mobile and offered no problem in mobilization. When the paramedian incision was used, care was taken to keep the rectus muscle intact.

Fig. 1.—Roentgenogram of the colon of a 4-year-old patient with congenital megacolon. Note the (1) normal appearance of the rectum, (2) the "harrowed" rectosigmoid area, (3) the widely dilated left side of the colon showing no haustral pattern, and (4) the undilated cecum and the ascending and portions of the transverse colon, also showing a good haustral pattern.

EXTENT OF RESECTION

The proximal extent of resection (fig. 2*B*) in all patients was determined preoperatively by means of roentgenograms. At laparotomy, with the entire colon exposed, the findings corroborated those obtained by roentgenograms. The rectal ampulla was of normal thickness and diameter. The "narrowed" area between the rectum

13. Swenson, O.; Rheinlander, H. F., and Diamond, I.: Hirschsprung's Disease: a New Concept of the Etiology: Operative Results in 34 Patients, New England J. Med. **241**: 551, 1949.

14. Swenson, O.: A New Surgical Treatment for Hirschsprung's Disease, Surgery **28**: 371, 1950.

15. Bodian, M.; Stephens, F. D., and Ward, B. C. H.: Hirschsprung's Disease, Lancet **1**: 19, 1950.

16. Hiatt, R. B.: Surgical Treatment of Congenital Megacolon, Ann. Surg. **133**: 321, 1951.

and the dilated sigmoid was of varied length but was present in all patients with true congenital megacolon. The division between the dilated left side of the colon (sigmoid, descending, and variable portions of the left side of the transverse colon) and the right portion of the colon was often clearly seen, particularly if care was taken not to push gas and stool back from the dilated sigmoid on mobilization of the latter. The level of transection of the bowel on the right side could be readily identified, for, at this level, the bowel was of normal thickness, and the longitudinal muscular bands were normally placed so as to produce haustrations. In 13 patients, this level of proximal transection was in the right half of the transverse colon; in the other 2, it was in the ascending colon, just proximal to the hepatic flexure in 1 patient, and in the left side of the transverse colon in the other, as determined fluoroscopically. In all instances, the colon was removed proximal to the most distal area

Fig. 2.—(*A*) A left paramedian incision is used. The rectus muscle is kept intact and retracted laterally. Note the inlying catheter. Frequently idiopathic dilatation of the urinary bladder is present in these patients and unless the bladder is emptied will interfere with the pelvic dissection and anastomosis of the colon to the rectum; (*B*) The proximal line of resection is depicted as being just beyond the hepatic flexure and the distal line is through the rectal ampulla, just beyond the "narrowed" rectosigmoid; (*C*) The posterior row of no. 40 silk sutures has been placed and is ready for tying. (*D*) The sutures in the posterior row have been tied and cut. The clamps have been rotated and the anterior row of sutures have been inserted. These are drawn up so the clamps are removed, and then they are tied. (*E*) Extraperitonealization of anastomosis.

of active peristalsis. This was done in order to avoid any error in utilizing bowel of questionable peristaltic activity. The distal line of resection was the upper rectum. The colon between the proximal and distal line of resection was removed, with careful ligature of the vessels in the mesentery close to the bowel. Definition of the normal rectal ampulla was made in all instances without difficulty and with as little dissection of the rectum as possible. This was done for two reasons: (1) to prevent injury to the nervi erigentes and (2) to avoid producing a large space between the rectum and hollow of the sacrum, which predisposes to perirectal infection and leakage at the line of anastomosis.

A closed, one layer type of anastomosis [17] was made, using Wangensteen's intestinal anastomosis clamps (fig. 2*C* and 2*D*). Interrupted no. 40 silk sutures were inserted in the Lambert fashion. Because of the long length of the rectal stump, there were no particular technical difficulties with the anastomoses. The levels of the anastomoses were between 6 and 10 cm. from the anal skin. After the anastomoses were completed, a rubber catheter was introduced from below and placed into the proximal colon for decompression purposes. Great care was taken to extraperitonealize the anastomosis (fig. 2*E*). In two patients, difficulty was encountered in bringing down the transverse colon to the rectum, because the distance between the upper abdomen and the pelvis is greater than normal in patients with megacolon. In these patients, the midcolic artery was clamped at its origin, and, after the collateral circulation was found to be good, the vessel was transected and tied. This resulted in the additional length needed to do the anastomosis without tension.

No attempt was made to close off the bare areas made by removing the descending and sigmoid colons and their respective mesenteries. At the level of the anastomosis, before closure, 1 gm. of streptomycin and 500,000 units of penicillin were routinely deposited within the peritoneal cavity. A nasal tube was left in the stomach for decompression purposes for approximately 48 hours after the operation. Closure of the abdominal wound in layers was carried out by the use of interrupted no. 30 silk ("deknatal"). Postoperatively, the patients received fluids parenterally, and dihydrostreptomycin and penicillin for the first four days. Early ambulation was practiced. The rectal tube was partly removed on the third day and completely withdrawn on the fourth day. The urethral catheter was removed on the third day and was reinserted if the residual urine measured more than 75 cc.

RESULTS

A total of 15 patients were operated on in the manner described above. There were no deaths and no leaks at the line of anastomosis.[18] The postoperative course was, for the most part, uncomplicated in all the patients. The clinical results in 14 patients were excellent, in that they had daily bowel movements without the aid of enemas or cathartics. The other patient, whose recovery could be rated only as good, experienced several bouts of abdominal distention and constipation after surgery; however, he responded well to enemas and again started having spontaneous bowel movements. The follow-up period of these patients ranged from six months to three years. Postoperatively, barium enemas showed good peristaltic activity and emptying of the residual colonic segment (fig. 3, 4, and 6). There was marked improvement in the general health and physical endurance in all patients operated on. In those patients who were still growing, there was a rapid increase in height and weight. The personalities of the patients also improved dramatic-

17. Wangensteen, O. H.: Aseptic Gastric Resection: A Method of Aseptic Anastomosis Adaptable to Any Segment of the Alimentary Canal (Esophagus, Stomach, Small or Large Intestine): Including Preliminary Description of Subtotal Excision of the Acid Secreting Area for Ulcer, Surg., Gynec. & Obst. **70**: 59, 1940.

18. Two patients with pseudomegacolon and megarectum experienced leaks at the line of anastomosis, necessitating proximal colostomies. Both made good progress after colostomy, but, as yet, the colostomies have not been closed.

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ally. The patients' ages ranged from 2 to 21 years. The oldest patient, now a university student, was checked from the standpoint of sexual function and was found to be normal, in that he had erections, and examinations of the semen showed a normal number of active and normal appearing sperms.

REPORT OF CASES

CASE 1.—G. K. was first seen at the University Hospitals in June, 1945, at the age of 5 weeks. He showed symptoms suggesting intestinal obstruction, and a laparotomy was performed. A volvulus was found, and 10 in. (25.40 cm.) of the sigmoid colon were resected, leaving a double-barrelled colostomy. The colostomy was closed in approximately two weeks, and the patient experienced marked abdominal distention. The abdominal cavity was explored again, approximately one week after closure of the colostomy. The anastomosis was found to be patent, but there was marked dilatation of the bowel, proximal to the line of anastomosis. No further reactions or anastomoses were done, and the patient was treated by means of repeated enemas and cathartics and was discharged in September, 1945, under reasonably good control. He was readmitted in October, 1946, because of recurring bouts of abdominal distention and intestinal obstruction. A laparotomy was done, at which time a diagnosis of congenital megacolon was made and a transverse colostomy was formed. After this, the patient improved considerably. He was well until May, 1947, at which time the colostomy closed spontaneously, and he again experienced intestinal obstruction. He was readmitted to the hospital; the colostomy was opened; and his symptoms subsided. Because of colostomy retraction and intestinal obstruction, he was readmitted to the hospital on June 27, 1947, at which time the transverse colon was brought up on the anterior abdominal wall over two glass rods placed through the mesocolon, with an effort to prevent retraction of the colon. It was noted that the transverse colon was decidedly thickened and dilated. Proctoscopic examination revealed no definite evidence of obstruction at the line of anastomosis, although there was a slight narrowing there. A no. 30 French catheter, however, easily passed through the anastomosis into the dilated colon proximally. After the transverse colostomy, the patient made good progress. On Sept. 28, 1948, the colostomy was closed. The patient got along well until January, 1949, when he again experienced vomiting and abdominal distention that could not be controlled by enemas. He returned to the hospital for examination on Feb. 15, 1949, at which time marked abdominal distention, with visible peristaltic waves was noted. The rectum, however, on examination was empty, and the flat plate of the abdomen showed marked distention of both large and small bowels. After active preoperative preparation, on March 3, 1949, the patient was again taken to the operating room; the narrowed rectosigmoid region was removed; and an anastomosis was made between the transverse colon and the rectum, 7 cm. from the anal skin. Postoperatively, the patient did well and on March 27 was discharged, 17 days postoperatively, at which time he was having three to four loose stools a day, regularly. He failed to keep his appointment in our outpatient department and was not seen again until Nov. 20, 1950, at which time he was having two stools a day without enemas and was active and appeared normal in every way. He had gained 14 lb. (6.4 kg.) and had grown 7½ in. (19.05 cm.) since his operation. Examination revealed the laparotomy scars, but there was no evidence of distention. Unfortunately, it was not possible to administer a barium enema at that time.

This child had the typical history of a patient with symptoms of intestinal obstruction beginning soon after birth; he was treated for a volvulus of the sigmoid before a definitive diagnosis of megacolon was made. Although an anastomosis was done between the transverse colon and the sigmoid and there was no definite evidence of obstruction at the line of the anastomosis, whenever his colostomy was closed, the proximal bowel distended, and he showed symptoms of intestinal obstruction, with marked abdominal distention. During the patient's last operation, the previous anastomosis was found to be patent, but there was a residual narrowed area of the rectosigmoid, approximately 5 cm. in length. This area was resected, and the transverse colon was brought down to the rectum. This experience is similar to that noted by others who have anastomosed the transverse colon to what appears to be normal sigmoid. After the removal of the narrowed sigmoid area, although the same proximal colon was utilized, by anastomosing it to the rectum, distal to the narrowed area, the patient has apparently been cured of his difficulty. The fact that he has no intestinal obstruction and has daily bowel movements, even though the rectum remains, substantiates the contention that it is not necessary to remove the rectum so long as the narrowed sigmoid area is removed and the actively contracting bowel is brought down and anastomosed to the residual rectal stump.

CASE 2.—R. F., a 21-year-old white man, was admitted to the University Hospitals on Sept. 28, 1949, and was discharged on Oct. 8, 1949. He was first seen at the University Hospitals in 1930, with a history of chronic constipation and abdominal distention since birth. He was acutely ill, with high fever, vomiting, and intestinal obstruction; he was successfully treated by means of hot water enemas administered by Dr. A. Friedell of our pediatric staff.[19] He got along reasonably well with medical therapy consisting of daily enemas, cathartics, and, for some time, methacholine (mecholyl®) bromide, without prolonged relief. He was first seen by us for the consideration of surgery on Aug. 29, 1949, and, although he had daily evacuations by means of enemas, he felt that he could no longer attend school, because he was unable to administer the enemas himself, away from home. He was admitted to the hospital on Sept. 28, 1949, and physical examination revealed a pronounced abdominal distention and definite flaring of the costal margin. Roentgenograms of the large bowel revealed the typical narrowed area in the region of the distal sigmoid and marked dilatation of the proximal sigmoid colon (fig. 6). After adequate preoperative preparation, laparotomy, was performed Sept. 29, 1949, at which time the sigmoid colon was found to be tremendously dilated and thickened. This process extended to the proximal one-third of the transverse colon, where a transformation from the abnormal to the normal texture of the bowel occurred. The narrowed area of the rectosigmoid was about 7 to 8 cm. long, but, distal, to this, the rectal ampulla had a normal transverse diameter. Resection of the colon, distal to the hepatic flexure and down to the rectal stump, was carried out; anastomosis was then made between the ascending colon and the rectum, about 7 cm. from the skin margin. Postoperatively, the patient made good progress and had spontaneous bowel movements, which were liquid at first, but, within a month after operation, they had become well formed. He was last seen on Dec. 11, 1950, at which time he had two to three well formed stools a day and had gained approximately 14 lb. (6.4 kg.) since operation. He was able to attend school and was also employed part-time; he handled both responsibilities without difficulty. A roentgenogram of the bowel, after a barium enema on Dec. 11, 1950, showed excellent contractility and emptying of the residual colonic pouch (fig. 8 and 9).

In this patient, the oldest in our present group, the involvement of the bowel, as determined by means of roentgenograms, apparently extended to the proximal one-third of the transverse colon, but, in order to insure an actively contracting colonic segment for the anastomosis, it was necessary to utilize the ascending colon and to anastomose this to the rectum. The patient's postoperative response was gratifying.

19. Friedell, A.: Congenital Megacolon Treated by Daily Hot Irrigations of Normal Saline Solutions at 115 Degrees, Minnesota Med. 21: 175, 1938.

CASE 3.—L. A., a 16-year-old white boy, was admitted to the University Hospitals on Oct. 23, 1949. He had a history of constipation since birth and required enemas for daily evacuation. A diagnosis of congenital megacolon was made, and, at the age of 3 (in 1936), a lumbar sympathectomy was done. This was followed by relief for three weeks, but the original symptoms of constipation reappeared. The patient experienced intestinal obstruction and generalized convulsions in June, 1940, and was treated by intestinal decompression and the vigorous use of enemas. He was given methacholine bromide, but, because of reactions and because no spontaneous evacuation of the bowel occurred, this medication was discontinued. By means of enemas, it was possible to produce daily evacuation and prevent marked distention of the bowel; however, because of the need for these daily enemas, the youngster could not actively participate in the usual social and athletic activities of his companions, and he became moody and presented a behavior problem. Roentgen examination of the large bowel revealed considerable spasm of the sigmoid colon, with pronounced dilatation of the descending and transverse portions of the colon. There was also considerable elevation of both leaves of the diaphragm. The right side of the colon, however, showed good peristaltic activity and haustral markings (fig. 10). On Oct. 26, 1949, laparotomy revealed a normal rectum, measuring 6 cm. in transverse diameter, but, starting at the rectosigmoid area and extending 14 to 15 cm. proximally, there was a narrowed segment of bowel, with a diameter of approximately 2 cm. The colon proximal to this was markedly dilated and hypertrophied. The haustral markings of the external surfaces were absent, being replaced with a continuous surface layer of opaque material. These changes in the bowel extended to the middle portion of the transverse colon, where the bowel wall, although somewhat thicker and more dilated than normal, had well-defined longitudinal muscle bands and haustrations. The transition from the abnormal to normal external surfaces of the bowel closely corresponded to the area where the haustral patterns and peristaltic activity appeared to be normal roentgenograhically. Balloons were placed in the transverse colon, the dilated sigmoid colon, and the narrowed rectosigmoid area. Although some small peristaltic waves were obtained, the interpretations of these tracings were difficult to evaluate. The colon from the junction of the proximal one-third and distal two-thirds of the transverse colon down to the rectal ampulla was resected, and an anastomosis between the transverse colon and the rectum was made, approximately 9 cm. from the anal skin margin. Postoperatively, the patient made good progress and was discharged on the 10th postoperative day, having two or three soft, well-formed stools spontaneously. He was followed in our outpatient department, and, on his last visit, one year after operation, he was having two stools of almost normal size and consistency a day. He had gained almost 20 lb. (9.1 kg.) and had grown 6 in. (15.24 cm.) and was no longer a behavior problem. Postoperative films, taken six months after surgery, revealed good contractility and evacuation powers of the residual segment of the colon (fig. 11).

CASE 4.—D. K., an 11-year-old white boy, was admitted to the University Hospitals on Jan. 3, 1950, and was discharged on Jan. 24, 1950. He had experienced marked constipation and abdominal distention since birth. He was first seen at the University Hospitals at the age of 3, when a diagnosis of congenital megacolon was made. He was placed on medical therapy, consisting of 200 mg. of methacholine bromide one-half hour after breakfast, mineral oil by mouth nightly, and mineral oil enemas as needed for relief from fecal and gaseous distention. With careful attention at home to details of this regimen, pronounced abdominal distention was prevented, and the child had daily evacuation. On several occasions, however, it was necessary to hospitalize him for episodes of acute intestinal obstruction, which were relieved by vigorous use of enemas. For almost a year prior to his last admission to the University Hospitals, management of the gaseous distention had become increasingly difficult. It was necessary for him to lie down once an hour, in order to expel the gas that distended his abdomen. Because of the increasing distention, his appetite was impaired. He was unable to attend school, and it was necessary to hospitalize him in his local community on several occasions for evacuation of his bowels. Physical examination on admission revealed a thin, pale, poorly developed boy, weighing 85 lb. (38.6 kg.) and measuring 53¾ in. (136.53 cm.) in height. He had marked flaring of the costal margins and great abdominal distention. Large loops of bowel could be easily seen beneath the distended anterior abdominal wall. After thorough cleansing of the bowel, a roentgenogram revealed an area of constriction at the rectosigmoid junction, with pronounced dilatation of the sigmoid and the descending and left side of the transverse colon. Proximal to this, the bowel was of smaller caliber and showed good, normal haustrations as well as active peristaltic waves. On Jan. 10, 1950, the patient was operated on; the dilated sigmoid and the descending and lateral, or distal, one-third of the transverse portions of the colon, along with the narrowed rectosigmoid, were excised. The rectosigmoid was 8 cm. long. The transverse colon was then brought down and anastomosed to the rectum, about 7 cm. from the anal margin. Postoperatively, the patient did well and began to have spontaneous semisolid stools on the fifth postoperative day. He was discharged on the 13th postoperative day, with the wound well healed and having soft but formed stools three times a day. About 10 days after his discharge from the hospital, he failed to pass any stool, and abdominal distention developed. He was examined with a proctoscope, and, although some narrowing was noted at the line of anastomosis, a no. 30 French rectal tube was passed without difficulty. He was admitted to the hospital for observation, and the rectal tube, which had been inserted during proctoscopy, was left inserted. The patient was given sitting up exercises to strengthen his abdominal muscles and instructed to go to the bathroom immediately after breakfast. He again started to have spontaneous bowel movements, and, after further observation for another week, during which he had almost normally formed stools daily, the patient was discharged. After his discharge, he made good progress, having spontaneous bowel movements of almost normal size daily, without further episodes of partial obstruction. Seven months after the operation, at a check-up, it was noted that he had gained approximately 10 lb. (4.5 kg.) and had grown 6 in. (15.24 cm.).

This patient had temporary but incomplete obstruction after surgery. The results of surgery can be classified as only good, in spite of the patient's weight gain and growth. This is the only patient in whom we anastomosed the left side of the transverse colon to the rectum; in the others, the colon was removed back to the right one-third or to the ascending colon. Although, in this patient haustral markings were present on the left side of the transvese colon, the transection of the bowel was probably made too close to the functionally inactive left side of the colon, and, consequently, the contractility of the distal portion of the residual colon was probably impaired. If this patient continues to have difficulty, we will resect the transverse colon and anastomose the ascending colon to the rectum.

CASE 5.—B. N., a 5-year-old white boy, was admitted to the University Hospitals on July 26, 1950, and was discharged on Aug. 29, 1950. He had a history of marked abdominal distention and failure to have spontaneous bowel movements, since birth. He needed daily enemas to produce bowel evacuation and to control abdominal distention. Examination revealed a well-developed, pale boy with a markedly protuberant abdomen. Peristaltic waves could be seen through the thin abdominal wall, and redundant loops of bowel filled with feces could be easily palpated. Roentgenograms of the colon showed pronounced distention of the sigmoid caused by gaseous and fecal retention. After adequate preperative preparation, the patient was operated on, on Aug. 15, 1950, at which time the colon distal to the junction of the right one-third and the left two-thirds of the transverse colon to the upper level of the rectum was removed. An anastomosis was then made between the transverse colon and the rectum, 8 cm. from the anal skin. The narrowed area of the rectosigmoid area measured approximately 6 cm. in length. Postoperatively, the patient made good progress and was discharged on the 14th postoperative day, having two to three well-formed, soft stools a day. At a postoperative visit, on Nov. 15, 1950, it was noted that he had grown 2½ in. (6.35 cm.) and had gained 3 lb. (1.3 kg.) since discharge from the hospital, three months previously. He was having between three and five semisolid stools spontane-

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ously, daily. A barium enema, on Nov. 16, 1950, revealed good contractility and evacuation of the remaining portion of the colon and lower ileum (fig. 4 and 5).

COMMENT

The mortality rate associated with nonsurgical treatment of congenital megacolon has been high, ranging from 37 to 79% [20]; however, these mortality rates pertain to the pretransfusion and preantibiotic eras, and the death rate is undoubtedly lower now. Although medical therapy may be successful, it is rarely ideal, for it entails untold hardship on both the parents and the child. No one can blame a child or his parents for seeking relief from the disagreeable task of colonic lavage, even though daily fecal evacuations are thereby produced. The importance of the psychosomatic aspects of this disease cannot be overemphasized. Almost without exception, our patients presented personality and behavior problems. Their poor general health, the need for repeated enemas, and the fact they could not participate in activities on an equal basis with their playmates could readily be considered sufficient cause for personality aberrations. One of the most gratifying results of successful surgical treatment was the disappearance of personality and behavior problems.

In congenital megacolon, the weight of evidence indicates that there is a basic defect in the development of the myenteric plexus in the rectum, rectosigmoid, and sigmoid colon. This results, supposedly, in a functional obstruction, with secondary dilatation and hypertrophy of the bowel proximally; however, there are a number of points that prevent wholehearted acceptance of this theory. 1. The absence of ganglion cells of the myenteric plexus is not always seen in the "narrowed" rectosigmoid area.[21] 2. The ganglion cells may also be absent in variable portions of the dilated sigmoid. 3. The rectum, as visualized by a barium enema, appears normal in size, shape, distensibility, and contractility. 4. If the changes in the bowel proximal to the narrowed areas were secondary to the obstruction alone, one would expect the cecum, because it has the largest diameter of all portions of the colon, to have the maximum dilatation [22]; however, the maximum dilatation is in the sigmoid. Roentgenographically, peristaltic activity is readily seen in the right side of the colon, but the dilated sigmoid shows almost no peristaltic activity or contraction. These observations point to some as yet unknown defect involving the entire left side of the colon and sparing the right side of the large bowel. In support of this theory is the fact that the right side of the colon is presumably parasympathetically innervated by the vagus, whereas the left side of the colon is innervated via the pelvic parasympathetic outflow.

Because of the findings uniformly noted in roentgenograms, namely, a normal appearing rectum and a functional, active colon on the right side and a dilated, functionless colon on the left side, it was logical to resect the latter and anastomose the right side of the colon (ascending or right side of the transverse colon) to the rectum. The results in the patients so treated justify this concept. This procedure has the following advantages over the "pull-through" technique. 1. The resection of the colon and the anastomoses are done in the peritoneal cavity. There is then no need for going below into the perineum, pulling through the proximal colon, and doing an unusual type of anastomosis from below. 2. The rectum is almost entirely removed in the "pull-through" procedure. This may result in damage to the nervi erigentes. It is well known that after a combined abdominoperineal resection, with removal of the rectum, the majority of males are impotent. The surgical procedure advocated by Swenson does not entail so wide a removal of perirectal tissues as in the combined abdominoperineal resection for carcinoma, and the fear of sterility may be unfounded, but, in the young male, the pelvis is narrow, and, consequently, the pelvic parasympathetic nerves are more vulnerable. When the rectum is left undisturbed and when the mesentery of the removed segments is cut across near the bowel, damage to the sympathetic as well as to the parasympathetic nerve fibers to the pelvic viscera is obviated.

SUMMARY AND CONCLUSIONS

1. Physiological studies of the colon, as determined by fluoroscopic and roentgenographic examinations after the administration of a barium enema, in 15 patients with congenital megacolon, reveal: (*a*) a normal appearing rectum, (*b*) a "narrowed" segment of the rectosigmoid and sigmoid portions of the colon of variable extent, (*c*) marked dilatation and absence of peristaltic waves and normal haustral markings of the descending, sigmoid, and variable portions of the left side of the transverse colon, and (*d*) active peristalsis and normal haustral markings of the cecum and the ascending colon and right side of the transverse colon.

2. When the colon was exposed at laparotomy, the differences between the right and left side of the colon were marked and corresponded to the roentgenographic findings.

3. A one stage transabdominal operative procedure is described in which the narrowed terminal segment of the sigmoid and portions of the colon showing no peristaltic activity roentgenographically are removed. The residual part of the large bowel (ascending colon or right side of the transverse colon) is then anastomosed to the upper portions of the rectum, 6 to 10 cm. from the anal skin margin.

4. The operation described was performed on 15 patients, with no deaths. Fourteen patients were greatly benefited by the operation, but the other patient had to resort to enemas on several occasions since operation. The follow-up period of these patients ranges from six months to three years.

5. Saving the rectum is important, because it eliminates the question of damage to the nervi erigentes, which is a deterrent to the whole hearted acceptance of operative procedures in which the rectum is removed.

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20. State, D., and Rogers, W.: Surgical Treatment of Congenital Megacolon, Bull. Univ. Minnesota Hospitals **22**: 164, 1950.

21. Ravitch, M., in discussion on Swenson, O.: New Surgical Treatment for Hirschsprung's Disease, Surgery **28**: 382, 1950.

22. Wangensteen, O. H.: Intestinal Obstructions: A Physiological and Clinical Consideration with Emphasis on Therapy, Including a Description of Operative Procedures, Springfield, Ill., Charles C Thomas, Publisher, 1942.

SELF-EXAMINATION OF THE BREASTS

C. D. Haagensen, M.D., New York

A half-century of application of radical surgery, radiation, and hormones in the attack on breast cancer has shown all too clearly that these methods of treatment can make only a limited gain in the control of the disease. The plain fact is that breast carcinoma is easily curable by good surgery when the primary lesion is small and the disease is limited to the breast. A 90% five year clinical cure rate is achieved with radical mastectomy in these cases. But when axillary metastases are present the cure rate is greatly diminished, and when distant metastases are present no cures at all are obtained. For the patients in this last category, improvement in surgical technique offers no hope whatever because the disease is far beyond the surgeon's reach. It has been recognized too late. The basic requisite for improvement in control of breast cancer is earlier diagnosis.

Can earlier diagnosis be achieved by better training of physicians? Only to a limited degree. Even if all physicians were ideally trained and able to detect breast carcinoma at its earliest palpable stage, the proportion of breast carcinomas discovered in this way would be relatively small, because only a small proportion of all adult women present themselves for physical examination often enough to assure the diagnosis of breast carcinoma at an early stage. In order to be reasonably certain of detecting breast carcinoma at an early stage the breasts must, in my opinion, be examined at least every two months. There are not enough physicians, enough time, or enough money to achieve this, even if women could be persuaded of the desirability of consulting physicians frequently for physical examination. Recent data collected by the American Institute of Public Opinion showed that only about one-third of the women questioned in a survey had consulted a physician within two months. In our own clinic 4.9% of breast carcinomas were discovered in patients who had no complaints referable to the breast but who were given a complete physical examination as a matter of routine.

If breast cancer is to be detected at an earlier stage in its development, it is the women themselves who must do it. This fact has led me to advocate the concept of self-examination of the breast. It is not a new concept. I first heard of it some years ago from the late Dr. Hugh Auchincloss. He had come to believe, as the result of a long experience in the Presbyterian Hospital with breast carcinoma, that women should be taught to examine their own breasts at regular intervals, and that they are often better able to feel breast tumors than an examining physician. I was at first hesitant to recommend self-examination, fearing that it would produce cancerphobia in susceptible patients, and being doubtful of the ability of women to feel their own tumors while they were yet small. My own experience has reassured me on both counts, and I am today firmly convinced that teaching women to examine their own breasts is the best hope of improving our control of breast carcinoma.

My argument rests on the following facts. In our latest Presbyterian Hospital series of cases of carcinoma of the breast the mean diameter of the primary tumor in the breast was 4.8 cm. These are clinical measurements made at the time of the patient's admission. The series included 668 patients with primary breast carcinoma who came to the hospital between 1935 and 1942. Three hundred and five, or 61.6%, of the 495 patients upon whom radical mastectomy was done, were proved to have axillary metastases. But among the 173 who did not have radical mastectomy the disease was inoperable in 129, and it may be assumed that all of these 129 had regional or distant metastases. Thirty-one patients who were too feeble to withstand operation, and 10 others who did not have it for other reasons, are properly set aside in calculating the frequency of metastases. The total incidence of metastases in the series of primary cases was therefore approximately 70%. The absolute five year clinical cure rate in the series of 668 primary cases was 38.6% (the absolute 5 year clinical cure rate is arrived at by dividing the total number of primary cases, without deductions of any sort, by the number of patients who remain well after five years).

In contrast to these average patients with breast carcinoma it is instructive to consider a group with small early carcinomas. I selected the patients whose primary tumors had been carefully measured on admission and found to be 15 mm. or less in their greatest diameter. There were 28 patients in the group, 3 with 5 mm. tumors, 11 with 10 mm. tumors, and 14 with 15 mm. lesions. Radical mastectomy was done in all 28 patients, and only 3, or 10.7%, were proved to have axillary metastases. The incidence of metastases in the average patients, whose tumors had a mean diameter of 4.8 cm., was therefore almost seven times as great as it was in the patients whose tumors had a mean diameter of only 1.5 cm. or less.

What this difference in the incidence of metastases means in terms of the chance of cure is obvious from the results in a series of cases of breast carcinoma in which a thoroughly radical type of mastectomy was done. The five year clinical cure rate for patients without axillary metastases was 90%, while it was only 41.3% for the patients proved to have axillary metastases. If, as the result of teaching women how to examine their own breasts, the proportion in whom carcinoma is discovered while it is yet early and small and before metastasis has occurred could be drastically changed, there might be hope for real progress toward the control of the disease.

TEACHING FILM

Two years ago, in cooperation with the National Cancer Institute of the U. S. Public Health Service and the American Cancer Society, a 16 mm. sound film in technicolor was made to test the feasibility of teaching women to examine their own breasts. Great care was taken in

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planning the film to avoid frightening the women who would see it. An attempt was made to demonstrate the technique physicians should use in examining the breasts, with proper emphasis on thoroughness and gentleness. Most physicians are too hasty and unsystematic in their examination of the breasts, and some are so heavy-handed that they distress their patients. A patient who has undergone such an experience is often unwilling to return for another examination. I have seen patients in whom palpation had been so rough that it produced ecchymosis! In the film the demonstration of how a physician should examine the breasts was followed by a portrayal of how he may teach his patient to examine her own breasts. Finally, an attempt was made to give the women seeing the film confidence that by means of careful and methodical self-examination they can be reasonably certain of discovering breast carcinoma, if they develop it, at an early enough stage to be cured.

The film has now been shown to audiences of women in various parts of the country for more than a year. Enough time has gone by to make some observations concerning its defects and merits, and to attempt to assess the value of the idea of self-examination of the breasts. It is already obvious that the film is popular with women. The demand for it on the part of women's clubs and organizations has been such that more than a thousand prints have had to be made of it. It is also popular among teachers of medicine, who are using it extensively in teaching medical students how to examine the breast.

An intensive and detailed study of the effectiveness of the film in teaching women to find their breast cancers earlier is being carried on in the state of Iowa under the direction of Dr. R. F. Kaiser of the National Cancer Institute of the U. S. Public Health Service, with service funds allocated for that purpose. A great majority of the adult women in the state are reported to have seen the film, and an effort will be made to measure the effects, if any, of this educational effort, in the years to come. Any statistical effect upon the control of breast cancer can scarcely be expected for a period of years, and ultimate evaluation of the effect of the film will be difficult.

I feel justified at this time, however, in presenting to physicians the idea of self-examination of the breasts, and a technique for teaching it to patients, so that physicians will be aware of the concept and ready to evaluate it. I also wish to offer some preliminary personal observations concerning the effects of the film upon women who have seen it.

TECHNIQUE FOR SELF-EXAMINATION OF THE BREAST

From an experience of some years in attempting to teach women a practical technique for examining their breasts, I came to use the method that has been presented in the film. The technique of self-examination is based, of course, on that which I have found preferable in my examination of the breast in my patients, a technique that I have described elsewhere.[1] The patient can not be expected to carry out all of the refinements of examination that a trained physician would employ, but she can be taught the essential features of an adequate examination of the breasts and how to use them relatively expertly.

Self-examination should be done when the woman is in negligee or night-clothes, as on retiring, so that there will be free access for inspection and palpation of the thorax and the breasts.

The first step in self-examination should be careful inspection of the breasts before a mirror. Women should be reassured about the inequality in the size of the breasts that many of them have, and which they may discover for the first time when they inspect their breasts carefully. They should be taught to look sharply, however, for asymmetry of the contours of the breasts and for dimpling of the skin. Since raising the arms sometimes brings out retraction signs, women should be taught to inspect their breasts first with their arms at their sides (fig. 1*A*), and then with their arms raised (fig. 1*B*). They should be taught that flattening and broadening of the nipple, as well as the nipple retraction of more advanced disease, are warning signs of cancer. They should, however, be reassured that simple inversion of the nipple, usually of many years' duration when it is observed in the middle-aged or older woman, is no reason for alarm. It should be emphasized that any erosion of the nipple surface, no matter how minute, or any spontaneous serous or bloody discharge from the nipple are signs of disease, requiring medical consultation. Other visible signs of

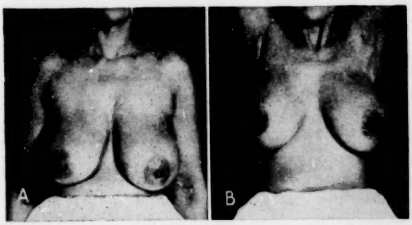

Fig. 1.—Inspection of breasts before a mirror. *A*, with the arms at the sides. *B*, with the arms raised.

breast disease, such as distortion of the areola and deviation of the axis of the nipple, are too difficult to see to be taught as a useful part of the self-examination routine.

The inspection part of the self-examination routine is not as important as palpation. Very few women notice the retraction signs that are all too evident with their breast carcinomas, but they usually feel the tumor. In self-examination, therefore, the emphasis should be upon palpation, which is the easiest discriminatory sense to educate.

The second step in self-examination should be to lie supine on a bed or couch. The arm on the side to be first examined should be raised above the head, and a small pillow, or if that is not available, a folded bath towel, placed under the shoulder (fig. 2*A*). This elevates the shoulder and shifts the breast somewhat medially, so that it is balanced and flattened out in as thin a layer as possible on the chest wall. If the shoulder is not elevated, the breast tends to fall laterally and fold upon itself, making palpation of the lateral half difficult (fig. 2*B*) because of its increased thickness.

The subject being in the proper position, palpation of the inner half of the breast is begun with the flat of the

1. Haagensen, C. D.: Carcinoma of Breast, J. A. M. A. **138**: 195-205 (Sept. 18) 1948; **138**: 279-292 (Sept. 25) 1948.

fingers of the opposite hand (fig. 3*A*). The palpation must be gentle, because tactile sensitivity is greatest with very gentle palpation. The whole extent of the inner half of the breast is explored, the examining hand tracing a series of transverse lines from the nipple line to the sternal edge, beginning just below the clavicle and descending to the inframammary fold (fig. 4*A*). The mammary tissue may reach the clavicle above and the sternum medially as a thin layer, and small carcinomas arising

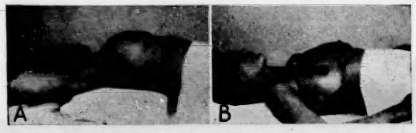

Fig. 2.—*A*, preferred position for self-examination of the breast, with a pillow under the shoulder so that the breast is balanced on the chest wall. *B*, Improper position for self-examination of the breast, with the shoulders flat on the table so that the breast falls laterally.

near the breast periphery may seem to be so superficial that they are often mistaken for harmless cutaneous lesions, even by examining physicians. A tumor anywhere in the breast area may be a carcinoma, and women should be taught to report it to a physician no matter how innocuous it may seem.

As a part of their instruction in self-examination women should be told of the existence of the inframammary ridge, and assured that it is not an indication of disease. The caudad edge of the breast is enfolded, and to a degree compressed, between the superficial and deep layers of the superficial fascia that tie it down to the thoracic wall. In younger or multiparous women in whom the breast tissue is more turgid the inframammary fold is not definable, but when in older women the breast becomes more flabby and atrophic, the inframammary ridge stands out as a denser, finely nodular ridge of tissue across its lower edge. Women often mistake this ridge for a tumor, and even some physicians are not aware that it is a normal structure. Neoplasms do, of course, sometimes develop within the inframammary ridge, and, when they do, diagnosis is difficult because the density of the ridge tends to mask them.

Having completed her palpation of the inner half of her breast, and of its lower edge, the woman is ready to examine the outer half of her breast. In this step it is preferable to have the arm down at the side, because the upper outer sector of the breast is more caudad in position, and therefore more accessible with the arm down (fig. 3*B*). The examining hand explores the whole extent of the outer half of the breast, tracing a series of transverse lines from the nipple line medially to the edge of the latissimus dorsi muscle laterally, beginning at the inframammary fold and ascending to the axilla (fig. 4*B*). The examination ends in the upper outer sector of the breast, which is the most difficult to examine because it is the thickest part of the breast. This sector, more often than any other part of the breast, shows nodularity that may be classified as within normal limits. It is also the sector in which dominant tumors representing disease are most often found. It is the sector of the breast, therefore, that should receive the greatest attention in any examination.

I believe that women should be discouraged from palpating their breasts while sitting up (fig. 5). If the breast is of average or larger than average size, palpation is more difficult in the erect position than in the supine position. In the erect position the lower dependent half of the breast is folded upon itself, and a small tumor may be masked by this increased thickness.

It is advisable for women to follow a definite technique such as has been described for self-examination, and to adhere to the routine of this technique. In this way they will become familiar with the physical characteristics of their breasts as revealed by repeated palpation with this one preferred method, and they will also be more likely to identify any small carcinoma that may develop in the breast.

In advising as to the frequency with which self-examination should be carried out, there is the dilemma of not wanting women to examine their breasts so often that they develop cancerphobia, but wanting them to carry out the examination often enough so that they have a reasonable chance of detecting carcinoma while it is yet in an early stage. My clinical experience with carcinoma of the breast has convinced me that the disease progresses more slowly than is generally thought. I believe that it takes at least from 6 to 12 months for a carcinoma to grow from a diameter of about 1 cm., at which it first becomes easily palpable, to 4.8 cm., the mean diameter of carcinomas in women coming for treatment today in this clinic. The aim with self-examination is, of course, to enable women to discover their breast tumors as soon as possible after they become palpable. I wish to push the moment at which tumor is discovered backward in time into the 6 to 12 month period that now elapses between the time a tumor becomes palpable and the time it is actually found. It has been suggested that monthly examination would be the safest way of achieving this aim. There is no doubt but that it would be preferable if it did not produce cancerphobia. I have been inclined, at least at the present stage of the effort to accustom the public to think of cancer in matter-of-fact terms, to advise that

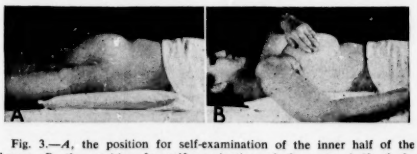

Fig. 3.—*A*, the position for self-examination of the inner half of the breast. *B*, the position for self-examination of the outer half of the breast.

self-examination of the breast be carried out only at two month intervals. I tell my patients to do it on the even numbered months. In an effort to guard the patients whom I instruct in self-examination against cancerphobia, I appeal to them not to palpate their breasts at any other occasion than the bimonthly examination and not to think about breast cancer except on this one occasion.

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For women who have not reached the menopause it is important to choose the correct phase of the menstrual cycle for self-examination of the breasts. In a considerable proportion of women there is enough vascular engorgement of the breasts in the premenstrual phase of the cycle to produce slight enlargement and increased turgidity of the breasts, and some tenderness. In a smaller number of women the engorgement is sufficiently pronounced to produce a degree of nodular thickening that may deceive the examiner into thinking actual tumors are present. It is desirable to carry out self-examination at the time when these transitory physiological changes are at a minimum, namely, in the immediate postmenstrual phase of the cycle.

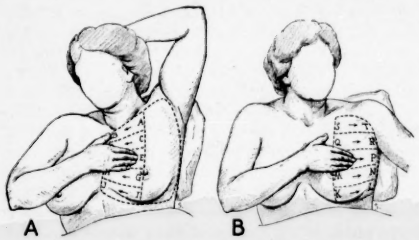


Fig. 4.—Positions of the hand for self-examination of the breast shown diagrammatically. *A*, for examination of the inner half. *B*, for examination of the outer half.

The question of what age is the right one to introduce the subject of self-examination is a debatable one. It is ridiculous to attempt to teach it to girls in their teens. It is doubtful that even young women in their final college years are mature enough for this discipline. It seems reasonable to begin instruction when women are in their early 30's. This is the age at which breast carcinoma first begins to have a considerable frequency, and it is the earliest age, in my opinion, at which women are willing to give thought and attention to such a serious subject as the detection of breast carcinoma. At this age they have founded their own families, and the responsibility of parenthood has sobered them and lengthened the shadow of fate before them.

EVALUATION OF SELF-EXAMINATION

Experienced clinicians know that the great majority of women who develop a breast tumor discover the lesion accidentally, usually while bathing or dressing. They happen to pass a hand over the portion of the breast containing the tumor and their attention is caught by the change in consistency or form. Neither folklore nor education have given the modern woman any idea of the possibility of purposeful self-examination of the breasts as a method of detecting cancer. The following case history illustrates this fact:

Mrs. X, a woman aged 42, while undressing happened to pass her hand over her right breast and discovered a lump in it. A paternal aunt had had breast carcinoma.

She came for examination the following day. There was a firm, poorly circumscribed tumor 3.5 cm. in diameter in the upper central portion of the breast. It was a carcinoma. Metastases were already present in the internal mammary lymph node chain. She eventually succumbed to the disease. She had discovered it too late.

This tragedy occurred despite the fact that the patient was the daughter of a physician and the wife of a physician, and as such had a better access than most women to medical knowledge. She had had a college education, and following her marriage had taken a prominent part in the Parent Teacher Association work in her community. Nowhere in these experiences had she learned that she could guard against breast cancer by examining her breasts herself.

In proposing to substitute purposeful search for accidental discovery of breast carcinoma, the first question to be asked is "Can women become sufficiently expert in self-examination of the breast to detect breast carcinoma at a reasonably early stage?" Experience has convinced me that they can. The best proof of this is the fact that women sometimes discover very small breast carcinomas by accidental palpation. I have seen a number of patients who have in this manner discovered breast carcinomas as small as 1 cm. in diameter. The following is such a case history.

Mrs. Y, aged 60, was active in civic affairs, and one day was given a bundle of brochures concerning cancer to distribute to the members of her club. She had had no special interest in cancer, and the task had been thrust on her as a duty that a public spirited woman ought to assume. As she lay in bed that evening thinking over the day's events, she recalled her promise to distribute the literature, and the fact that she had read none of it herself troubled her conscience. So she picked up one of the leaflets and read that a lump in the breast may be a sign of breast cancer. As she read, she instinctively put her right hand to the upper outer sector of her left breast. She was shocked to feel a very small firm lump. She slept badly and the next morning cancelled her plans for the day and consulted her internist. He confirmed her finding and sent her to me. Her tumor was hard, rather discrete, and measured 10 mm. in diameter. There was a suggestion of dimpling in the overlying skin. There were no palpable axillary lymph nodes. At operation frozen section confirmed the clinical diagnosis of carcinoma. Radical mastectomy was done. The axillary lymph nodes were not involved. All this was 10 years ago, and she is still well. It is fair to say that this woman saved her own life by finding her carcinoma at this early stage.

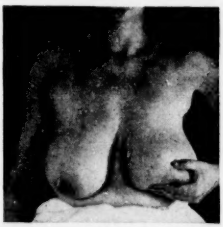
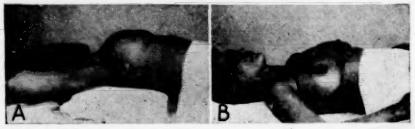


Fig. 5.—Improper method of self-examination of the breast.

If it is possible for women to discover small early carcinomas by fleeting, casual palpation of this kind, it is certainly reasonable to expect them to discover them much more successfully after they have been taught to examine their breasts methodically with a correct and thorough technique. I know from my personal effort in teaching women to examine their own breasts that tumors, both benign and malignant, may, indeed, be found as a result of such teaching. Not all of the tumors thus discovered have been small, but some of those which proved to be malignant have been not only small but had not metastasized. The following is a case history.

fingers of the opposite hand (fig. 3*A*). The palpation must be gentle, because tactile sensitivity is greatest with very gentle palpation. The whole extent of the inner half of the breast is explored, the examining hand tracing a series of transverse lines from the nipple line to the sternal edge, beginning just below the clavicle and descending to the inframammary fold (fig. 4*A*). The mammary tissue may reach the clavicle above and the sternum medially as a thin layer, and small carcinomas arising



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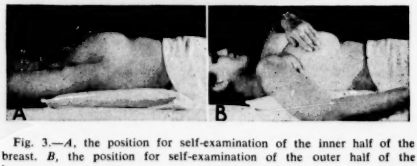

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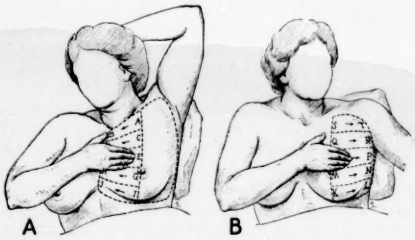

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Mrs. X, a woman aged 42, while undressing happened to pass her hand over her right breast and discovered a lump in it. A paternal aunt had had breast carcinoma.

She came for examination the following day. There was a firm, poorly circumscribed tumor 3.5 cm. in diameter in the upper central portion of the breast. It was a carcinoma. Metastases were already present in the internal mammary lymph node chain. She eventually succumbed to the disease. She had discovered it too late.

This tragedy occurred despite the fact that the patient was the daughter of a physician and the wife of a physician, and as such had a better access than most women to medical knowledge. She had had a college education, and following her marriage had taken a prominent part in the Parent Teacher Association work in her community. Nowhere in these experiences had she learned that she could guard against breast cancer by examining her breasts herself.

In proposing to substitute purposeful search for accidental discovery of breast carcinoma, the first question to be asked is "Can women become sufficiently expert in self-examination of the breast to detect breast carcinoma at a reasonably early stage?" Experience has convinced me that they can. The best proof of this is the fact that women sometimes discover very small breast carcinomas by accidental palpation. I have seen a number of patients who have in this manner discovered breast carcinomas as small as 1 cm. in diameter. The following is such a case history.

Mrs. Y, aged 60, was active in civic affairs, and one day was given a bundle of brochures concerning cancer to distribute to the members of her club. She had had no special interest in cancer, and the task had been thrust on her as a duty that a public spirited woman ought to assume. As she lay in bed that evening thinking over the day's events, she recalled her promise to distribute the literature, and the fact that she had read none of it herself troubled her conscience. So she picked up one of the leaflets and read that a lump in the breast may be a sign of breast cancer. As she read, she instinctively put her right hand to the upper outer sector of her left breast. She was shocked to feel a very small firm lump. She slept badly and the next morning cancelled her plans for the day and consulted her internist. He confirmed her finding and sent her to me. Her tumor was hard, rather discrete, and measured 10 mm. in diameter. There was a suggestion of dimpling in the overlying skin. There were no palpable axillary lymph nodes. At operation frozen section confirmed the clinical diagnosis of carcinoma. Radical mastectomy was done. The axillary lymph nodes were not involved. All this was 10 years ago, and she is still well. It is fair to say that this woman saved her own life by finding her carcinoma at this early stage.

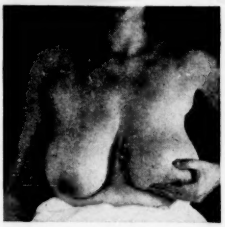

Fig. 5.—Improper method of self-examination of the breast.

If it is possible for women to discover small early carcinomas by fleeting, casual palpation of this kind, it is certainly reasonable to expect them to discover them much more successfully after they have been taught to examine their breasts methodically with a correct and thorough technique. I know from my personal effort in teaching women to examine their own breasts that tumors, both benign and malignant, may, indeed, be found as a result of such teaching. Not all of the tumors thus discovered have been small, but some of those which proved to be malignant have been not only small but had not metastasized. The following is a case history.

Miss Z, a single woman aged 42, attended a showing of the film "Breast Self-Examination." That evening she examined her breasts according to the technique illustrated in the film, and found a tumor in the upper outer sector of the left breast. She came at once for consultation. The tumor was firm, poorly circumscribed, measured 2 cm. in diameter, and gave a definite retraction sign in the overlying skin on forward bending. Radical mastectomy was done. Fifty-four axillary lymph nodes were found, none of which contained metastases.

Experiences such as this have convinced me that women can become comparatively expert at palpating tumors in their own breasts. They have advantages that an examining physician can not possess. In the first place a woman palpating her own breasts is concerned with the findings in two breasts only. As she examines them repeatedly she becomes thoroughly familiar with their special characteristics. An examining physician has to attempt to recall the comparative findings in a great many breasts, a difficult feat no matter how detailed his written records may be. A woman examining her own breasts has a second important advantage: it is the proprioceptive tactile sense that helps her in palpating her own tissues.

To further emphasize that women may become expert at self-examination of their breasts, I must point out that in several instances women have come to me with small breast tumors which they had discovered but which I was unable to find in my first palpation. As a result of such experiences I have learned, in all humility, to ask patients in whom I have not found a tumor whether or not they feel one, and if they do to show me its location.

Teaching women to examine their own breasts will, beyond question, produce cancerphobia in some women and do them more harm than good. There are some women so unstable mentally that fear of cancer, often focused by family tragedy due to the disease, makes any rational consideration of it impossible. Some can not palpate their breasts at all without becoming terrified. Others palpate them daily and constantly torment themselves with thought of the disease. Physicians should therefore take care to teach self-examination only to those of their patients whom they know well enough to be certain that they will be able to think about the problem with the necessary degree of detachment. When the concept of breast self-examination is presented to women at large by means of the film, however, there can be no selection of subjects and some harm will certainly result.

In the last analysis the value of the concept of self-examination of the breasts will be determined only by teaching it widely over a long period of time and with the best modern educational techniques. Before this is done the idea should have the approval of physicians, for the public should and does look to physicians for judgment concerning a basic health concept of this kind. If physicians will but test out the concept by teaching self-examination of the breasts to their own patients, I am confident that they will eventually give the idea their approval. Some physicians will be tempted to condemn self-examination as a poor substitute for examination by a physician. They should face the fact that there are few women who can go to a physician for physical examination often enough to hope to have breast carcinoma discovered at an early and curable stage. To be reasonably safe a woman should be examined at least every two months. Self-examination is the only possible method of achieving this. It is a means of protection available to every woman, no matter how remote she may be from her physician. It costs nothing.

Physicians must also face the fact that the practice of self-examination will add to their difficulties in the diagnosis of lesions of the breast. When women examine their own breasts they find a remarkable variety of tumors and tumor-like formations. Most of these are the nodular thickening due to the physiological changes in the breast associated with the menstrual cycle. These are usually most prominent in the premenstrual phase of the cycle, but may persist over a considerable part of the cycle. Reexamination is often necessary to be certain that such nodularity is within physiological limits and that biopsy is not indicated. The examiner must, however, learn to recognize a tumor due to disease, and must understand that prompt surgical investigation of all such tumors in a hospital with all preparations made for a radical mastectomy is imperative. Pathology is the discipline that guides and educates the physician in making the decision as to what changes in the breast require surgical investigation. As women find tumors earlier and earlier with the popularization of self-examination, their recognition becomes an increasing challenge. Physicians must attempt to meet the challenge by giving more time and care to the examination of the breasts.

630 W. 168th St.

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Carcinoma in Situ.—A carcinoma in situ is a neoplastic entity wherein the tumor cells still lie within the epithelium of origin. We accept the fact that they are cancer cells because, when they leave this site of origin and infiltrate or disseminate, their appearance is that of the cells still resident within the site of origin. This similarity is the only thing we have to identify them as cancer cells. Hence, in our present state of knowledge, they are cancer cells.

There is abundant evidence that these cancer cells may have remained within this site of origin for ten years or longer. This extensive period of relative quiescence, although most commonly recognized in the uterine cervix, is by no means thus restricted. It can be observed in in-situ malignant cervical lesions, laryngeal cancers, glandular cancers of the endometrium, lobular carcinomas of the breast, and perhaps other neoplasms. Chronology can be established only by fortunate accident in such cases. Thus, in a biopsy report of in-situ cancer of the larynx occurring many years ago the clinician doubted the report of carcinoma and did nothing. Infiltrating carcinoma first became apparent seven years later. . . . I do not wish to infer that this slow evolution is a feature of all cancer development; if such were the case, we would have no means of proving it. Rather I suspect it to be a feature of some examples of many types of cancer, and a feature common rather than rare. I do suggest that slow evolution is evidence of control.

Every cancer must begin as a cancer in situ—although this term is popularly applied to one anatomic type, cancer of the cervix. It may be equally applied to many mammary cancers, not alone the in-situ lobular carcinomas, but also the papillary cancers of ducts that fail to infiltrate. The term is suited to describe certain bronchus cancers, many early cancers in rectal polyps, some gastric cancers, some endometrial growths, and would have a much wider application if we only saw more early lesions.—Fred W. Stewart, Experiences in Spontaneous Regression of Neoplastic Disease in Man, *Texas Reports on Biology and Medicine*, Spring, 1952.

RETICULUM CELL SARCOMA

REPORT OF A THIRTEEN-YEAR SURVIVAL FOLLOWING ONE THOUSAND ROENTGENS OF X-RAY THERAPY

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and
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Reticulum cell sarcoma is still a distinct problem from the standpoint of pathological classification and treatment. It is generally classified as a lymphosarcoma or as a malignant lymphoma. It is usually treated by external irradiation, although for apparently accessible local disease surgery has some advocates. Despite a dramatic initial response to irradiation in many cases, ultimate prognosis is poor and the usual life expectancy is between 6 and 24 months from the time of the diagnosis.[1]

The case reported here is one of a surgically inaccessible, highly malignant reticulum cell sarcoma, given only 1,000 r of external irradiation. Despite this limited treatment, the patient has for 13 years remained free of clinical recurrence, an extremely rare outcome for such a tumor.

REPORT OF A CASE

R. W., a 16-year-old white girl, was admitted to the Massachusetts Memorial Hospitals on June 10, 1938, with a swelling in her right supraclavicular fossa of about three months' duration.

Physical examination revealed an obese white girl with a somewhat nodular and firm fixed mass of tissue almost filling this space. Results of x-ray studies of the right clavicle, disclosed no abnormalities. Laboratory studies showed only mild leukocytosis and a slightly elevated blood sedimentation rate. The patient was discharged with a diagnosis of chronic lymphadenitis.

The mass continued to enlarge, rupturing centrally and exuding "watery material." In addition, numbness had developed in the fingers of the right hand. There was no weight loss or other significant complaints. The patient was readmitted to the hospital 10 weeks after her first admission. Her past history was essentially noncontributory. She had had the usual childhood diseases and for the past seven years had been taking two "pituitary" pills daily, apparently for obesity.

The family history was noncontributory. Physical examination on the second admission revealed that the mass in the right supraclavicular fossa was somewhat larger than previously and that it overlay the right clavicle. The mass was hard and fixed but presented centrally a flucuant area of 4 cm., which was not warm or tender but was draining thin fluid. The surrounding skin was thickened, red, and scaling. There were small hard nodes in the right axilla. No nodes were noted in the left axillary or cervical regions.

The hemoglobin was 11.5 gm. (74.5%), with a 4,150,000 red blood cell count. The leukocyte count was 10,600, with 88% polymorphonuclear leukocytes. The blood sedimentation rate was 18.5 mm. per hour. The results of serologic studies were negative. Total protein was 6.54 gm. per 100 cc., with 1:1 albumen-globulin ratio. The urine was normal. A culture from the sinus in the mass showed no growth.

Chest x-ray disclosed no abnormalities. X-ray of the right supraclavicular region revealed soft tissue swelling with a slight defect in the cortex along the upper border of the mid-third clavicle. This defect measured 7 by 1 mm. and was interpreted as possible tumor erosion. The preoperative impression was either cellulitis with abscess or neoplasm of the lymphoblastoma type.

On Sept. 8, 1938, with gas-oxygen-ether anesthesia, the brawny edematous skin overlying the right supraclavicular fossa was incised, permitting the escape of a small amount of thin, dark blood and revealing a 3 by 2 cm. cavity lined with friable, necrotic, translucent yellow-gray tissue. Several round resilient nodes about 1 cm. in diameter were palpable in the median supraclavicular area. The mass could not be excised, and only biopsy was done.

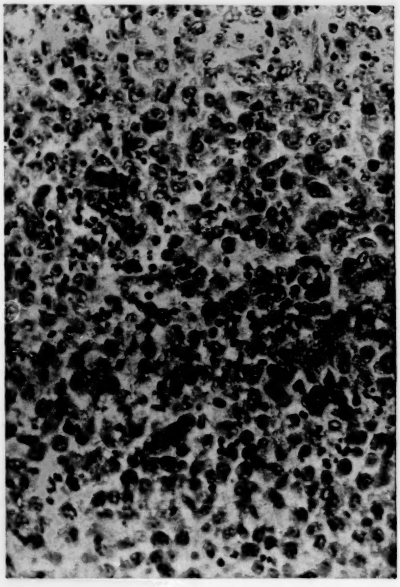

Fig. 1.—Reticulum cell sarcoma (patient R. W.). Note the extreme degree of mitosis and anaplasticity (low power).

The radiological study (fig. 1 and 2) revealed the specimen to consist of rapidly growing, extremely undifferentiated, irregular polygonal cells, showing tremendous anaplasia and large num-

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1. (*a*) Hamann, A.: External Irradiation with Roentgen Rays and Radium in the Treatment of Human Leukemias, Lymphomas, and Allied Disorders of the Hemopoietic System, Radiology **50**: 378-385 (March) 1948. (*b*) Hellwig, A. C.: Malignant Lymphoma: Analysis of 202 Cases, Am. J. Clin. Path. **16**: 564-573 (Sept.) 1946. (*c*) Sugarbaker, E. D., and Craver, L. F.: Lymphosarcoma: Study of 196 Cases with Biopsy, J. A. M. A. **115**: 17 (July 6); 112 (July 13) 1940. (*d*) Jenkinson, E. L.; Kinzer, R. E., and Brown, W. H.: Lymphosarcoma, with Special Reference to Reticulum Cell Type, Am. J. Roentgenol. **48**: 433-438 (Oct.) 1942.

bers of mitotic figures. These tended to be irregularly rounded and showed a preponderance of nuclear material. The cytoplasm was extremely clear and vesicular in character, and the cells were supported by a small amount of rather highly vascularized stroma. There were extensive areas of necrosis throughout, infiltrated with products of acute inflammation. Because of the extremely rapidly growing nature of the tumor (with numerous mitosis), the pathologist believed that the tumor would be relatively radiosensitive. Radiation therapy was then administered through one supraclavicular port, measuring 10 by 15 cm., with 200 kv. at a target skin distance of 50 cm.

COMMENT

Although the initial response of reticulum cell sarcoma to radiation may be good, the ultimate prognosis is generally regarded as unfavorable.[2] Jenkins and co-workers [1d] reported a series of 8 cases of reticulum cell sarcoma with an average two-year survival following radiation therapy. Lenz and Portmann [3] have reported in detail their results observed two years after external irradiation therapy in 136 cases of lymphosarcoma, including reticulum cell sarcoma. In general, recurrence rates for the neoplasms in this series were inversely proportional to the dosage of x-ray, with only 20% recurrence after two years in patients given 2,000 to 3,000 r, but about 72% recurrence when only 1,000 r was administered. They found, furthermore, that reticulum cell sarcoma in particular was very prone to recur and most likely to do so if the dosages were under 2,000 r and the lesions more than 5 cm. in diameter, as in the case reported here. For such tumors they recommended at least 3,000 r and up to 5,000 r if tissues and treatment fields permitted. Age is also of prognostic importance. Stout,[4] reporting 89 cases of reticulum cell sarcoma from Presbyterian Hospital, found no instance of 10 year survival in patients under 30 years of age and only 12.1% of all patients with reticulum cell sarcoma survived for as long as five years.

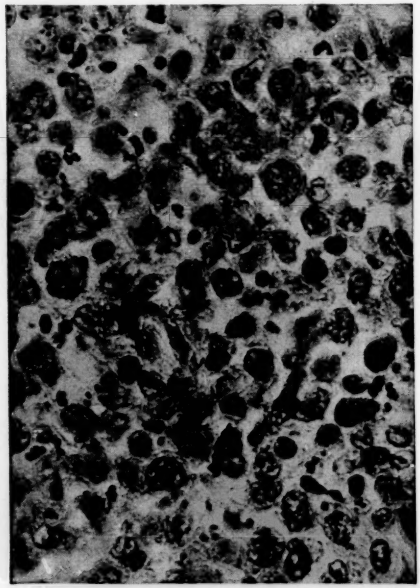

Fig. 2.—Reticulum cell sarcoma (patient R. W.). Note the cellularity and vesiculation of the nuclei (higher power than figure 1).

Autopsy statistics indicate that malignant lymphomas may be found in localized form in 10% of cases.[1b] It is for this small group with locally confined disease that surgical extirpation is the procedure of choice. The results are somewhat encouraging. Sugarbaker and Craver [1c] reported a 24% five-year survival for solitary reticulum cell sarcoma treated by surgical extirpation. Later follow-up for this series has not been reported to date. Hellwig's results parallel those of Sugarbaker and Craver. He reported a 24.6% five-year survival for surgically treated localized malignant lymphomas. His series included a single patient with reticulocytoma (highly undifferentiated reticulum cell) who was alive and well 20 years after surgery. Supplementary radiation therapy appeared to be without effect on ultimate survival in Hellwig's series of surgically treated patients.

SUMMARY

The reticulum cell sarcoma reported here occurred in a 16-year-old white girl. The tumor was of a highly malignant type and was inaccessible for surgical removal. At present, 13 years after irradiation treatment, the patient shows no evidence of recurrence of the tumor, although she received only 1,000 r of x-ray treatment. The experience of roentgenologists dealing with this problem suggests, however, that a much higher dosage should be employed.

1093 Beacon St. (46) (Dr. Lenson).

2. Hellwig,[1b] Jenkins, Kinzer, and Brown.[1d]

3. Lenz, M.: Personal communication to the authors. Portmann, U. V.: Clinical Therapeutic Radiology, New York, Thos. Nelson & Sons, 1950, pp. 545-570.

4. Stout, A. P.: Is Lymphosarcoma Curable? J. A. M. A. **118**: 968-970 (March 21) 1942.

Blood Transfusion.—It behooves every physician who contemplates transfusing patients with blood to take certain precautions concerning the selection of both the blood and the patient. Every patient who is to be transfused should be carefully questioned for a history of previous transfusions or previous transfusion reactions. If the patient is a woman additional information regarding pregnancies and hemorrhagic disturbances should be obtained. It is generally agreed that husbands (or their immediate relatives) should not be used as donors for their wives unless an emergency exists and other donors are not available.

Avoidable human errors in the selection of blood probably account for a majority of incompatible transfusion reactions; consequently extreme care in the typing and cross-matching of blood is necessary. The routine employment of the indirect Coombs test would provide greater safety by the detection of unsuspected Rh antibodies in previously sensitized patients. It should be remembered that sensitization by one or more blood group antigens is possible whenever transfusions are given.—Charles H. McCroskey, M.D., and Stanley R. Friesen, M.D., Hemorrhagic Transfusion Reactions, *The Journal of the Kansas Medical Society*, March, 1952.

CLINICAL NOTES

WOLFF-PARKINSON-WHITE SYNDROME IN AN INFANT

Oglesby Paul, M.D.
and
C. Jack Harrison, M.D., Chicago

The syndrome characterized by paroxysms of auricular tachycardia, fibrillation, or flutter in association with the electrocardiographic picture of a short P-R interval and a prolonged QRS interval as seen in healthy adults was described in 1930 by Wolff, Parkinson, and White.[1] The electrocardiographic findings had been noted first by Wilson [2] in 1915, who produced the characteristic abnormalities by varying types of vagal stimulation. Subsequently, many publications have described single or multiple examples of this interesting condition, but it was not until 1946 that the typical features of the syndrome were noted in an infant, aged 14 weeks.[3] In all, four infants have been reported as having the Wolff-Parkinson-White syndrome, aged 5 weeks,[4] 14 weeks (two cases),[5] and 4½ months.[6] In the infant on whom we are reporting paroxysmal tachycardia first developed at the age of 5 weeks, and the true nature of the condition was recognized 10 days later.

It is important for several reasons to recognize that this entity can occur in infants. First, it lends support to the thesis that the syndrome is not acquired but exists at birth and is due to the existence of unusual conduction pathways between the auricles and ventricles, permitting premature ventricular excitation; second, it calls attention to the need at all ages for differentiating the electrocardiographic findings encountered with the Wolff-Parkinson-White syndrome from bundle branch block due to acquired disease or septal defects; and finally, the paroxysmal arrhythmias may in infants, as seen in the case reported, give rise to serious congestive heart failure, although such a complication is stated to be rare in adults.[7]

REPORT OF A CASE

A male infant weighing 6 lb. (2,722 gm.) was delivered uneventfully at term on Feb. 13, 1951. It was stated that the mother had been well throughout this, her fifth, pregnancy. Examination of the infant at birth revealed no abnormality; he proceeded to gain weight satisfactorily on breast feeding and was discharged on Feb. 18, 1951. He was seen at the age of five weeks for a routine check-up, at which time an extremely rapid regular heart rate, estimated to be 300 beats per minute, was found. On reexamination three days later, the tachycardia had disappeared, and a regular rhythm, with a rate of 120 beats per minute, was present. During the next few days, the mother reported that on three occasions during feeding the baby became blue and seemed short of breath. Because of these symptoms, admission to the Presbyterian Hospital was advised.

Physical examination at the time of admission on March 31, 1951, showed a well-developed infant weighing 8 lb. 7 oz. (3,827 gm.) not in any respiratory distress. The rectal temperature was 98.8 F. His color appeared normal until he cried, when cyanosis of the forehead and circumoral region was seen. The neck veins were distended and pulsating, and the lungs were clear. By percussion, the heart was slightly enlarged, the rate was 290 and regular and was not modified by carotid sinus pressure; no murmurs or gallop could be detected. The liver edge was palpable three fingerbreadths below the right costal margin. The peripheral pulses were normal, and there was no edema.

The blood hemoglobin level was 10.8 gm. per 100 cc., the red blood cell count was 3,390,000 per cubic millimeter, and the white blood cell count was 4,300 per cubic millimeter. A urine specimen was normal. Fluoroscopy of the chest was considered to be within normal limits. An electrocardiogram taken on the day of admission (fig. 1) revealed a supraventricular tachycardia with a rate of 300.

The diagnosis of supraventricular tachycardia accompanied by congestive heart failure was made. Digifolin, 0.05 gm., was administered intramuscularly, and the infant was placed in an oxygen tent. Three hours later, the heart rate was 150, and, on the following day, it was noted that the neck veins were normal, auscultation of the heart revealed nothing remarkable, and the liver edge had receded to one fingerbreadth below the costal margin. No further tachycardia was observed, and cyanosis did not recur even during vigorous crying or at the time of feeding. Digifolin in doses of 0.025 gm. was administered on each of the next two days, and subsequently the infant was maintained on tincture of digitalis, two drops daily.

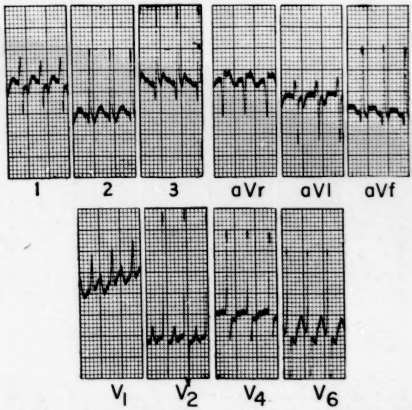

Fig. 1.—Electrocardiogram taken on the day of admission showing a supraventricular tachycardia at a rate of 300.

A repeat electrocardiogram taken on April 3, 1951, while the baby was crying lustily showed a sinus rhythm with a rate of 190, a P-R interval of 0.07 seconds with high peaked P waves, a QRS interval of 0.08 to 0.09 seconds, right axis deviation, and notable notching or slurring of the upstroke of the R waves in leads 1, 2, aVl, aVf, V_2, V_4, and V_6. The precordial leads were characterized by high R waves in all leads, no S wave being present in V_1. A tracing repeated on the following day (fig. 2) when the rate varied between 166 and 187 showed similar find-

1. Wolff, L.; Parkinson, J., and White, P. D.: Bundle Branch Block with Short P-R Interval in Healthy Young People Prone to Paroxysmal Tachycardia, Am. Heart J. **5**: 685 (Aug.) 1930.
2. Wilson, F. N.: A Case in Which the Vagus Influenced the Form of the Ventricular Complex of the Electrocardiogram, Arch. Int. Med. **16**: 1008 (Dec.) 1915.
3. Bodlander, J. W.: The Wolff-Parkinson-White Syndrome in Association with Congenital Heart Disease: Coarctation of the Aorta: Report of a Case, Am. Heart J. **31**: 785 (June) 1946.
4. Schieve, J. F.: Paroxysmal Tachycardia in an Infant with Wolff-Parkinson-White Syndrome, Am. J. Dis. Child. **77**: 474 (April) 1949.
5. Bodlander.[3] Kimball, J. L., and Burch, G.: The Prognosis of the Wolff-Parkinson-White Syndrome, Ann. Int. Med. **27**: 239 (Aug.) 1947.
6. Richmond, J. B.; Moore, H. R., and Callen, I. R.: The Wolff-Parkinson-White Syndrome in an Infant, Pediatrics **1**: 635 (May) 1948.
7. Wolff, L., and White, P. D.: Syndrome of Short P-R Interval with Abnormal QRS Complexes and Paroxysmal Tachycardia, Arch. Int. Med. **82**: 446 (Nov.) 1948.

ings, the P-R interval measuring 0.07 to 0.09 seconds and the QRS interval, 0.09 seconds. The diagnosis of the Wolff-Parkinson-White syndrome was made on the basis of the previous supraventricular tachycardia, the short P-R interval with the QRS interval actually longer than the P-R interval, and the typical slurring of the ascending limb of the R waves. These findings were confirmed by a repeat electrocardiogram taken two weeks later, at which time the rate was 160, the P waves were much lower, and the same characteristic features were present.

The infant was last seen on June 25, 1951, at which time he weighed 14 lb. 5 oz. (6,492 gm.) and his pulse was 135 and regular. He appeared to be doing well in all respects.

SUMMARY

In a male infant, otherwise in good health, a supraventricular tachycardia developed, with a rate of 300, at the age of five weeks, with symptoms and signs of congestive heart failure. Following treatment with digitalis, the rhythm reverted to normal, the evidences of myocardial failure disappeared, and the electrocardiographic tracings were found to be characteristic of the Wolff-Parkinson-White syndrome.

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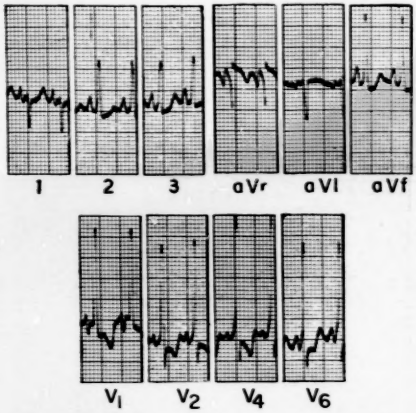

Fig. 2.—Electrocardiogram taken following reversion to a sinus rhythm. Note particularly the findings in leads 1, V_1, and V_6, where the short P-R interval is associated with notching or slurring of the upstroke of the R wave.

Hazards of Radioactive Isotopes.—The use of radioactive isotopes involves hazards which must be appreciated. These may arise during handling of radioactive materials or from their ingestion, inhalation, or absorption through the body-surface. To the patient the danger arises from the deposition of active material in the body. Many years will go by before the long-term effects of non-destructive doses of radiation can be fully evaluated, but the gravest dangers appear to be carcinogenesis and the production of undesirable mutation of genes in cells of reproduction. Careful judgment is therefore required before a decision is made to administer a radioactive isotope to a patient either for therapeutic purposes or for tracer investigations. . . . In the case of a radioactive element which has a long half-life, and which is retained for long periods in an organ, the investigator will find it extremely difficult to find a small enough dose of the isotope which will be of practical value.—Certain Aspects of the Medical Application of Isotopic Tracers: Critical Review, G. Popják, *The Quarterly Journal of Medicine*, January, 1952.

DETERMINATION OF FAT TOLERANCE IN PATIENTS WITH MYOCARDIAL INFARCTION

METHOD UTILIZING SERUM TURBIDITY CHANGES FOLLOWING A FAT MEAL

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Asher Woldow, M.D.
and
Richard A. Dunsmore, M.D., Philadelphia

In recent years attention has been focused on the possibility that the physical state and particle size of the serum lipids rather than their chemical properties may be etiologically significant in atherosclerosis. Studies utilizing such diverse techniques as chylomicron counts,[1] nephelometry,[2] or ultracentrifugation [3] suggest that comparatively large lipid or lipoprotein particles suspended in the blood may be related to the presence of atherosclerosis. However, these methods of study, although of great value in the investigation of the problem, are not readily applicable as routine procedures in the clinical laboratory, since they entail the use of involved techniques or special apparatus.

The measurement of serum turbidity in an ordinary photoelectric colorimeter is a simple, reliable, rapid, and inexpensive method of determining the presence of macromolecular particles suspended in the blood. Particles with diameters more than one-quarter of the wave length of visible light (or 0.1 μ) deflect and scatter incident rays of light and give the serum the appearance of turbidity or lipemia.[4] Since lipids exist in the serum as colloidal particles, the clarity or turbidity of serum is determined to a large degree by the number and size of these particles, although other factors such as the shape of the suspended particles exert a minor part in the production of serum turbidity.

We have been studying serum turbidity levels in normal and abnormal subjects after the ingestion of a fat meal. It is the purpose of this report to describe the procedure and to present the results of serum turbidity studies carried out after the ingestion of a standard fat meal in a control group of 24 subjects and in a group of 23 patients with coronary atherosclerosis who were recovering from acute myocardial infarction at the time of the study.

The control group, consisting of 10 women and 14 men, included nurses and hospital attendants, as well as patients who were about to be discharged from the hospital following acute infections or minor surgical procedures. Their ages ranged from 19 to 79 years. Eleven who were less than 40 years of age had no evidence of

From the Division of Cardiology, Philadelphia General Hospital, and the Albert Einstein Medical Center, Northern Division.

1. Becker, G. H.; Meyer, J., and Necheles, H.: Fat Absorption and Atherosclerosis, Science **110**: 529 (Nov. 18) 1949.

2. Moreton, J. R.: Chylomicronemia, Fat Tolerance, and Atherosclerosis, J. Lab. & Clin. Med. **35**: 373 (March) 1950.

3. Gofman, J. W., and others: Blood Lipids and Human Atherosclerosis, Circulation **2**: 161 (Aug.) 1950.

4. Ahrens, E. H., Jr., and Kunkel, H. G.: The Stabilization of Serum Lipid Emulsions by Serum Phospholipids, J. Exper. Med. **90**: 409 (Nov.) 1949.

cardiovascular disease. The remaining 13 showed either minimal or no evidence of cardiovascular disease clinically and electrocardiographically although 6 in this group were over 60 years of age.

The 23 patients with coronary atherosclerosis included 2 women. Their ages ranged from 35 to 78 years. All had unequivocal clinical and electrocardiographic evidence of recent myocardial infarction, and were studied from one to eight weeks after the acute episode. All except three patients in this group were receiving bishydroxycoumarin (dicumarol*) at the time of this study. All were on the regular hospital diet.

METHOD

The test consisted of a quantitative comparison by turbidimetry of the lipemia that follows the ingestion of a standard fat meal. After a 12 hour fast 10 cc. of venous blood were obtained from the subject. Immediately thereafter a fat meal was given. This consisted of a measured amount of cream containing approximately 20% fat (ordinary light cream), with an otherwise fat free breakfast, including a small glass of fruit juice, one slice of unbuttered toast, and a cup of coffee with sugar. Since the blood volumes of different persons are closely correlated to their surface areas,[5] the cream was given in the arbitrary amount of 100 cc. per square meter of the subject's body surface area using the Du Bois height-weight surface area formula.[6] No further food was allowed during the test period. Ten cc. of venous blood were then collected three hours and five hours after the test meal. The blood specimens were allowed to stand at room temperature for three hours, and were then centrifuged at approximately 2000 rpm for 20 minutes. The supernatant serum was pipetted off entirely free from all blood cells, fibrin, and platelet fragments. Hemolysis was carefully avoided. Turbidity readings of the serums were made in a photoelectric colorimeter using micro tubes. Distilled water was used as a blank, and a red filter (640 to 700 mμ) was used to minimize serum color or slight degrees of hemolysis. Grossly hemolyzed or icteric serums were not used in these determinations. We have expressed our results in terms of the direct scale readings[7] obtained in a Klett-Summerson photoelectric colorimeter.

RESULTS

The quantity of cream ingested in the test meal by subjects in the two groups was comparable. It varied from 150 to 210 cc., with an average of 182 cc. in the control group, and varied from 140 to 204 cc., with an average of 177 cc., in the group of patients with myocardial infarction (tables 1 and 2). There was no apparent correlation between the quantity of cream ingested and the resultant serum turbidity either in the control subjects or in the patients with myocardial infarction.

The serum turbidity readings of the fasting specimens were significantly higher in the patients with myocardial infarction than in the control subjects (probability less than 0.001), but there was considerable overlapping in the two groups. The Klett-Summerson readings varied from 25 to 45 units, with an average of 31 units in the control group, and varied from 30 to 52 units, with an average of 39 units in the group with myocardial infarction.

All subjects had a measurable increase in serum turbidity after the fat meal, but the increase was significantly greater both three and five hours after ingesting the fat meal in the myocardial infarction group than in the controls (probability less than 0.001). Serum turbidity was greater in the three hour than in the five hour specimens in all but 12 subjects, 5 of whom were control subjects and 7 of whom were in the group with myocardial infarction. All 12 persons with a delayed increase in serum turbidity were over 50 years of age.

TABLE 1.—*Serum Turbidity in Control Subjects Following a Standard Fat Meal*

Case No.	Age	Sex	Cream Ingested, Cc.	Turbidity Units				Description or Diagnosis of Controls
				Fasting	3 Hr.	5 Hr.	Total*	
1	19	F	188	28	120	55	88	Attendant
2	20	M	177	26	38	33	36	Spontaneous pneumothorax
3	21	F	172	26	74	70	72	Post cystitis
4	22	F	188	32	132	54	93	Attendant
5	22	F	187	29	68	32	50	Nurse
6	24	F	186	26	38	34	36	Nurse
7	25	F	187	32	72	70	71	Nurse
8	25	M	162	40	79	62	71	Post pneumonia
9	26	F	184	32	104	55	80	Attendant
10	31	M	197	30	55	50	53	Post pneumonia
11	38	M	175	31	67	51	59	Post pneumonia
12	40	M	185	30	185	52	119	Neurocirculatory asthenia
13	42	M	165	45	89	59	74	Post pneumonia
14	42	M	172	30	75	56	66	Post acute bronchitis
15	52	M	175	26	53	86	70	Quiescent pulmonary tuberculosis
16	54	M	195	25	62	118	90	Post osteomyelitis
17	58	M	180	28	54	90	72	Post rectal surgery
18	58	M	180	33	75	35	55	Post transurethral prostatectomy
19	64	F	198	30	52	90	71	Post pneumonia
20	64	M	195	40	63	73	68	Post cholecystitis
21	65	F	200	28	150	64	107	Post acute bronchitis
22	66	M	210	29	131	40	86	Post cellulitis
23	70	M	158	38	108	72	90	Emphysema
24	79	F	150	30	52	39	46	Post pneumonia
Average			182	31	83	60	72	

* Average of three and five hour postprandial serum turbidity readings of each subject.

All 12 patients with myocardial infarction who showed a delayed increase in serum turbidity were over 50 years of age. Of the 12 control subjects who showed a delayed increase in serum turbidity, 5 were over 50 years of age, 4 were between 40 and 50 years of age, and 3 were between 20 and 30 years of age.

5. Best, C. H., and Taylor, N. B.: The Physiological Basis of Medical Practice: A University of Toronto Text in Applied Physiology, Baltimore, Williams & Wilkins Company, 1945, p. 16.

6. Du Bois, E. F.: Basal Metabolism in Health and Disease, ed. 3, Philadelphia, Lea & Febiger, 1936, p. 125.

7. Optical density values may be obtained by multiplying the direct scale readings by 0.002.

In order to compare conveniently the postprandial serum turbidity levels, the serum turbidity readings of the three and five hour specimens of each subject were averaged, and the resulting value was designated as the person's postprandial total turbidity. In the control group total turbidity varied from 36 to 119 units, with an average of 72 units (table 3). Total turbidity was less than 100 units in all the control subjects except two, one man and one woman, aged 40 and 65 years, whose total turbidity values were 119 and 107 units, respectively (cases 12 and 21, table 1).

Total turbidity varied from 65 to 274 units, with an average of 149 units in the group with myocardial infarction. Total turbidity was more than 100 units in all but three patients in this group, all men, aged 45, 54, and 67, whose total turbidity values were 75, 74, and 65 units, respectively (cases 2, 8, and 15, table 2). They showed no apparent deviation clinically from the rest of the group.

TABLE 2.—*Serum Turbidity in Patients with Myocardial Infarction Following a Standard Fat Meal*

Case No.	Age	Sex	Cream Ingested, Cc.	Turbidity Units				Week of Convalescence
				Fasting	3 Hr.	5 Hr.	Total*	
1	35	M	204	43	375	146	261	3
2	45	M	172	30	86	63	75	1
3	46	M	170	50	138	90	114	3
4	48	M	160	37	123	115	119	6
5	49	M	170	42	315	233	274	2
6	50	M	180	35	220	85	153	3
7	52	M	193	50	90	114	102	3
8	54	M	204	32	68	79	74	3
9	54	M	190	42	246	144	195	4
10	54	M	202	38	125	81	103	3
11	56	M	184	52	229	190	210	4
12	60	M	176	35	115	150	133	3
13	62	M	175	40	278	70	174	2
14	62	M	174	41	158	132	145	2
15	67	M	165	30	96	33	65	3
16	67	M	174	36	167	108	138	4
17	68	M	172	39	192	78	135	4
18	70	M	175	45	266	244	255	4
19	70	M	174	40	230	250	240	4
20	73	M	184	34	145	57	101	1
21	76	F	177	44	90	195	143	4
22	78	F	140	31	89	145	117	8
23	78	M	165	36	96	115	106	6
		Average	177	39	171	127	149	

* Average of three and five hour postprandial serum turbidity readings of each subject.

COMMENT

Although the total number of patients tested in this study was small, there was a significantly greater increase in postprandial serum turbidity in the group with myocardial infarction than in the control group (probability less than 0.001). Significant differences between the two groups were noted at both the three and five hour levels. Because of the apparent delay in fat absorption in some of the subjects, these differences in postprandial serum turbidity values were best demonstrated by averaging serum turbidity values obtained three hours and five hours after ingestion of a standard fat meal.

An evaluation of the effect of other variables, such as age and sex, on the results cannot be adequately determined in the present limited study. However, the average postprandial total turbidity of the 12 control subjects who were 40 years old or less was 69 units, as compared to the average of 75 units of the 12 control subjects who were more than 40 years old. A similar comparison between the 10 women and 14 men in the control group revealed average postprandial total turbidity values of 71 and 72 units, respectively. These average values were all significantly lower than the average postprandial total turbidity obtained in the group with myocardial infarction.

Other variables, such as the administration of bishydroxycoumarin and the general effect of the recent acute illness on the patients with myocardial infarction, may have been factors that favored increased serum turbidity levels in this group. Further investigation is now in progress to determine the relative importance of such factors. However, all three patients with myocardial infarction whose postprandial total turbidity levels were below 100 units (cases 2, 8, and 15, table 2) were receiving bishydroxycoumarin when tested while the three patients who were not treated with bishydroxycoumarin (cases 4, 14, and 22, table 2) had moderately high levels of postprandial serum turbidity. In regard to the possible effect of the recent acute illness in increasing the serum turbidity levels, it was noted that the five patients who were tested during the first two weeks of their convalescence (cases 2, 5, 13, 14, and 20, table 2) had an average postprandial total turbidity of 154 units, while the 10 patients who were tested during the fourth week and later (cases 4, 9, 11, 16, 17, 18, 19, 21, 22, and 23, table 2) had an average postprandial total turbidity of 166 units. In this connection it should be kept in mind that there was no apparent increase in postprandial serum turbidity values in the control subjects who were convalescing from acute infection when they were tested (table 1).

TABLE 3.—*Serum Turbidity in Control Subjects and in Patients with Myocardial Infarction Following a Standard Fat Meal*

Group	Total	No. of Subjects with Total Turbidity*		Total Turbidity Units*		
		Less Than 100 Units	More Than 100 Units	Lowest	Highest	Average
Control subjects	24	22	2	36	119	72
Patients with myocardial infarction	23	3	20	65	274	149

* Average of three and five hour postprandial serum turbidity readings of each subject.

SUMMARY

A method of estimating fat tolerance on the basis of serum turbidity changes following the ingestion of a standard fat meal, as determined in a photoelectric colorimeter, is described. Study of control subjects and patients with myocardial infarction showed a considerably greater increase in postprandial serum turbidity in the group with myocardial infarction than in the control group. This finding suggests that the procedure may be a useful clinical method of evaluating the possible role of altered fat metabolism in the etiology of atherosclerosis.

8340 Fayette St. (Dr. Schwartz).

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COUNCIL ON PHARMACY AND CHEMISTRY

REPORT TO THE COUNCIL

The Council has authorized publication of the following report from the Committee on Pesticides.

R. T. STORMONT, M.D., *Secretary.*

The following is the second in a series of general reports on select aspects of pesticides. It is prompted by the growing general concern over the efficacy and safety of electric vaporizing units for the dispersion of insecticides within buildings. Proponents of this method of insect control claim that it is superior to other available means because of its greater convenience, efficiency, and freedom from danger as compared with more conventional methods, such as hand spraying of insecticides. Others have felt that sustained exposure on a work-day or longer basis is intrinsically unsound because little is known about the effects of long-term exposure to low concentrations of insecticides in the atmosphere. While brief or occasional exposure appears to be harmless, it is not reasonable to expect that human beings can avoid injury if they are exposed for longer periods year after year to a toxic agent in atmospheric concentrations that kill insects in a few hours. It is further advanced that the resultant injury may be cumulative or delayed, or simulate a chronic disease of other origin, thereby making identification and statistical comparison difficult or impossible.

The danger of substituting other more toxic chemicals when insect resistance to presently used compounds occurs, the temptation to relax sanitary precautions, and the lack of adequate justification for use in the light of these factors are additional reasons for viewing with concern the expanding use of vaporizing devices in human environment. The following report, therefore, is intended as an evaluation of the available data. For information on the pharmacology and toxicology of the chemicals used in electric vaporizers for insecticides, the reader is referred to previous Committee reports on DDT (J. A. M. A. **145**:728 [March 10] 1951) *and lindane* (J. A. M. A. **147**:571 [Oct. 6] 1951).

BERNARD E. CONLEY, *Secretary, Committee on Pesticides*

HEALTH HAZARDS OF ELECTRIC VAPORIZING DEVICES FOR INSECTICIDES

During the last war small smoke generators for insecticides were found by the military to be useful for the rapid destruction of mosquitoes. The convenience and simplicity of their use suggested peace-time applications for the disinfestation of rooms in homes and commercial establishments. Early trials of devices for these purposes were not too promising. While this method of control was more efficient than older means, such as flyswatters and gummed paper, its use in kitchens caused complaints that food and water became tainted and unpalatable with the insecticides used. It was thought that these and other esthetic objections could be obviated by use of more refined mixtures of DDT (dichlorodiphenyltrichloroethane), benzene hexachloride, or their isomers. Eventually purer insecticidal chemicals and improved methods of formulation and application set aside the initial objections.

The technologic improvements in chemicals and methods of dispersal were not accompanied by parallel advances in knowledge of the physiologic actions of the insecticidal ingredients, particularly with respect to their chronic toxicity and inhalation hazards. As the use of thermal insecticide dispensers expanded, concern developed regarding the dangers of sustained exposure to vapors and particulate matter, especially where circumstances of use fostered an uneven distribution of insecticide. The apprehension was not without foundation since there was no published evidence to support the extravagant claims for safety in home and commercial use which accompanied the promotion of certain makes of the devices. Even now, specific facts are lacking on many aspects of usage of insecticides leading to chronic toxicity from inhalation exposure and food contamination. Nevertheless, independent studies conducted at academic centers and by various divisions of the Federal Security Agency and the United States Department of Agriculture have recently developed sufficient data to warrant conservative appraisal of the uses and limitation of these devices.

At the present time, several types of generators of insecticide vapors or fumes have been advertised or proposed for use here and abroad in homes, food establishments, industrial plants, hospitals, and schools. The commercially available devices include automatic, thermostatically controlled and manually controlled electric vaporizers which operate continuously, unless the source of heat, a light bulb or heating element, is turned off. Fumigating strips consisting of insecticide-impregnated wicks which are ignited in closed rooms have been proposed for use in food processing establishments in continental Europe. A fourth type of device, based on a somewhat different operating principle, is also undergoing development in this country. It consists of an insecticide-treated glass filter from which vapors are blown by means of an air current. Its proposed use and the end result of this device are basically the same as those connected with the preceding types.

Electrically operated thermal generators employ technical DDT, lindane, or a mixture of both in an inert base with a composition which may include substances such as glycols, carbowaxes, bentonite, or other clays. The insecticidal ingredients are placed in a cup of the generator and are slowly evaporated by a built-in heating element or some other heat source, such as an electric light bulb. The recommended rate of discharge for the automatic, thermostatically controlled apparatus is 1 gm. of insecticide in 15,000 cu. ft. for a 24 hour period. Greater concentrations may be expected with the more inadequately controlled, manually operated machines under comparable conditions.

The insecticidal ingredients are discharged as vapors or fumes which ultimately recrystallize on the ceiling, walls, and other exposed surfaces. The amount and surface distribution pattern of the recrystallized material varies with the insecticide or mixture of insecticides used and the ventilation characteristics in the rooms in which insect control is effected. Chamber tests indicate that the distribution pattern is extremely uneven with surface deposits of insecticide generally decreasing in density as distance from the generator increases. Much of the recrystallized material deposits on the ceiling and walls adjacent to the device, and it is possible for the material to accumulate to such an extent that loose crystals may become dislodged and fall to the floor or other horizontal surfaces below. This tendency is greatest with devices employing DDT.

The atmospheric dispersal of insecticide vapors or fumes is similarly irregular. The concentration of DDT in the atmosphere, except in the area immediately above the generating unit, is in the order of 0.13 to 1.3 mg. (0.009 to 0.09 ppm) per cu. m. of air when dispensed by a properly operating, thermostatically controlled machine. Lindane vapors from the same device have been found in concentrations ranging from 0.09 to 0.2 mg. (0.008 to 0.017 ppm) per cu. m. of air. If the average active person breathes approximately 10 cu. m. of air in an eight hour period, the maximum theoretical intake of insecticide may be approximately 1.3 to 13 mg. of DDT or 0.9 to 2 mg. of lindane during a normal work-day period. Correspondingly higher values could be expected when exposure to automatic devices is for longer periods or where inadequately controlled devices are employed. Use of the units in a space smaller than a room 40 x 40 x 10 ft., which roughly corresponds to the volume previously described, also predisposes to higher intake values.

The DDT level in the atmosphere approaches a concentration which might be considered to exceed a safe level for continuous exposure over a prolonged period of time. The lindane concentration is below the estimated safe level, although regular and continuous exposure is considered unwise. This atmospheric level of lindane coupled with its comparatively greater freedom from long-term toxic effects may have partially influenced the change from DDT which has occurred in the use of the automatic, thermostatically controlled type of insecticide generators. The principal reason behind this change, however, was the increasing incidence of insect resistance which is being encountered with the use of DDT. Resistance factors may have also

contributed to selection of lindane as the impregnate in insecticide fumigating strips which in continental Europe are being proposed for home and commercial use. In this case, however, other considerations are also involved. While the rate of discharge is only slightly in excess of that used by the controlled temperature devices, the generating and dispersion processes are different. Food contamination from particulate matter dispensed by the glowing strip and the inhalation of possibly more toxic degradation products produced by the burning of the insecticide are items on which knowledge is lacking.

The health problems associated with the use of these devices have not gone unnoticed. Recently, the Interdepartmental Committee on Pest Control, which is composed of representatives of the Departments of Agriculture, Interior, and Defense and the Federal Security Agency, issued a statement on the health hazards of the automatic "vaporizer." The statement defined the conditions under which such devices employing DDT, BHC (benzene hexachloride), or mixtures of the two could be used with reasonable safety and cautioned against their use where available evidence suggested that dangers may exist. The Interdepartmental Committee's recommendations included use only where human exposure is on a normal working day basis, as in commercial establishments, and at a rate not to exceed 1 gm. to 15,000 cu. ft. for a 24 hour period. It recommended that units be installed above head level, 3 ft. or more below the ceiling, and removed from areas where condensation of the insecticide on walls, ceilings, nearby equipment, or fixtures could fall into, or otherwise contaminate, exposed food. It was also recommended that only devices be employed which have protective features, such as pilot lights to indicate periods of operation and fuses, to prevent excessive output, overloading, and excessive operating temperatures. The committee cautioned against continuous exposure to the devices and advised against their use in homes and sleeping quarters.

Since the issuance of this statement, the Committee on Pesticides has been advised of a number of reports of poisoning. A summary of the pertinent facts in several representative cases follows.

Generalized urticaria developed in a 35-year-old woman, in excellent health previously, one day after the installation of an automatic, thermostatically controlled vaporizing device at her place of employment. The device dispensed lindane and was hung 8 ft. above the floor and 12 ft. from where she performed her clerical duties.

Over weekends, while not in contact with the lindane vapors, her condition improved, but on returning to work, urticaria would recur. Two patch tests, 10 days apart, with the insecticide gave negative results, although removal of the device allowed the patient to return to work without recurrence of the symptoms. Two months later, while eating in a restaurant, she again experienced itching and smarting of the skin. On looking around she noticed a vaporizing device nearby. Other employees in the office, which was inadequately ventilated, reported "hives" and smarting of the eyes when the device was in operation.

A mild peripheral neuritis developed in a 50-year-old woman over a period of several months after she had been continuously exposed to manually controlled insecticide generators for over a year. The patient was a stable, intelligent person whose general health, except for occasional migraine attacks, had been excellent prior to the onset of the present condition. She resided in an eight room house in which continuously operating insecticide dispensers were installed in the bathroom and in the kitchen. The devices employed a mixture of 70% technical DDT and 30% lindane which was heated to a molten condition in the vaporizer cup by an electric light bulb. The report stated that the device used in the kitchen released sufficient insecticide or its degradation products (vaporized hydrochloric acid) to discolor the adjacent walls. It also stated that the patient frequently prepared food at and ate from a table situated close to the vaporizer and may have ingested significant amounts of the insecticide deposited on the table by the vaporizer.

A refreshment stand operator and his employee became ill after entering their place of business which contained a thermostatically controlled vaporizer. A strong, musty odor was noticed initially and shortly thereafter both persons experienced severe headache, nausea, and irritation of the eyes, nose, and throat. Symptoms disappeared two hours after the device was disconnected and the stand thoroughly aired. Examination of the dispenser, which was stated to have contained benzene hexachloride, disclosed a dark brown amorphous mass caked at the bottom of the vaporizer container. A strong musty odor permeated the room when a portion of the caked material was scraped off for laboratory analysis. Vaporization at higher than recommended rates coupled with the use of the technical mixture or an isomer of benzene hexachloride other than lindane, or a combination of those circumstances, were thought to be the causative factors in these cases.

A similar occurrence in another food dispensing establishment has also been reported. In this instance, a make-shift vaporizer which utilized an electric light bulb as a heat source caused symptoms of headache, nausea, and eye irritation in four employees shortly after installation. Symptoms, which subsided when the apparatus was turned off, were attributed to high concentrations of insecticide resulting from a poorly controlled heat source.

Other reports of irritation and illness have been brought to the attention of the Committee. Six industrial workers experienced headaches and mucous membrane irritations after exposure to the products dispensed by an overheated lindane vaporizer. Severe frontal headaches are said to be increasingly common among personnel servicing and adjusting the units at regular intervals. Several suspected instances of adverse reactions to home and office installed vaporizers have also been reported. Unfortunately, complete information is unavailable at the present time on the extent of injury and the circumstances of use.

Investigation has shown that, in many instances, acrid fumes are dispensed as the result of chemical alteration of the insecticide caused by foreign contaminants in the mixture or from the metallic container and because of faulty vaporizing devices which allowed excessive operating temperatures. Operation in poorly ventilated living or working areas and excessive exposure as the result of use in confined areas or through intimate contact during servicing are basic causes of complaint.

The allergic reactions described in the first case are not unexpected. Their probable incidence is relatively low, and would not in themselves militate against the restricted use of thermal aerosol insecticide generators. The systemic effects ascribed to exposure to certain types of these devices in the second case is a subject of more concern. In view of the general good health of the patient, the circumstances of her exposure, and the reported appearance of related syndromes in another person [1] as well as in animals exposed over a long time to chlorinated hydrocarbon insecticides, it is not unlikely that the patient's condition was occasioned, at least in part, by the ingredients discharged by the home vaporizer. The cause and effect relationship in conditions such as peripheral neuritis is sometimes hard to establish, although the evidence presented in the foregoing instance is so strongly suggestive that the burden of proof may well revert to those who would disclaim the insecticides and their manner of discharge as etiologic factors.

The foregoing cases reaffirm the warning against excessive exposure to electric vaporizers. The distribution and continued use of make-shift dispensers or those without mechanical features which protect against fire hazard, excessive vaporization, or the chemical alteration of the insecticidal ingredients because of high temperatures should be actively discouraged. Caution against the substitution of other chemicals for DDT, lindane, or their mixtures in thermal aerosol or vaporizing dispensers cannot be too strongly urged. Few if any of the devices which are currently in operation have the protective features previously enumerated, and many do not even provide for thermostatic control. The continued operation of such devices violates accepted health practice and therefore they should be supplanted by more acceptable means of insect control.

Federal regulatory agencies, particularly the Insecticide Division, United States Department of Agriculture, have challenged the promotion and use of these dispensers in homes and small capacity areas. While the devices themselves are not subject to registration under the federal law, the insecticides for use in them are so controlled and must be registered. At the present time, lindane or DDT recommended for use in thermal

1. Campbell, A. M. G.: DDT Poisoning in Man: Suspected Cases, Lancet 2: 1178 (Dec. 24) 1949.

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generators cannot be registered under the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, unless the devices in which they will be used meet the safety specifications, other than the pilot light provision, of the Interdepartmental Committee's recommendations. This restraint is applicable only to the specified insecticides for use in thermal generators intended for interstate distribution. Vaporizers which are already in use or are not entered into interstate commerce are beyond the jurisdiction of the Federal Act. Several states and municipalities have recognized the urgency of this problem at the state and local level and are considering ordinances and other types of appropriate regulations. When such an approach is undertaken, the responsibility vested in local health officers should be kept in mind since they and their staffs are administratively in the best position to observe and correct practices contrary to public health and welfare.

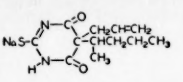
NEW AND NONOFFICIAL REMEDIES

The following additional article has been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

R. T. STORMONT, M.D., *Secretary.*

Thiamylal Sodium.—Surital Sodium (Parke, Davis).—$C_{11}H_{17}N_2NaO_2S$.—M.W. 276.34.—Sodium 5-allyl-5-(1-methylbutyl)-2-thiobarbiturate.—Thiamylal sodium is marketed as a mixture with sodium carbonate. The mixture is prepared by adding thiamylal and sodium carbonate to just enough sodium hydroxide solution to dissolve the salts. The pH is adjusted between 10.7 and 10.9. The solution is made up to volume with water, and is filtered, sterilized and lyophilized.

The structural formula of thiamylal sodium may be represented as follows:



Actions and Uses.—Thiamylal sodium is an ultra-short acting barbiturate and is particularly used for intravenous anesthesia in procedures of relatively short duration. Its anesthetic potency has been found to be about 1.4 to 1.5 times that of thiopental sodium so that smaller doses are required to produce an equivalent level of anesthesia. The cumulative effect of thiamylal sodium is reported to be less than that of thiopental sodium. Its action is rapid; anesthesia generally occurs within 20 to 60 seconds and recovery may be expected within 10 to 30 minutes after the last injection, depending upon the amount of the drug administered.

Thiamylal sodium is employed intravenously as the sole anesthetic agent in relatively short surgical procedures and as a supplement to local anesthetics during regional and spinal anesthesia or for induction prior to general anesthetics during prolonged procedures. It is compatible with the use of curare drugs employed to increase surgical relaxation. It is also administered rectally for diagnostic procedures in children.

Thiamylal sodium is detoxified by the liver and should not be employed in patients with hepatic dysfunction or disease. It should be employed with caution in the presence of respiratory disease or obstruction, anemia, obesity, severe disturbance of arterial tension, and cardiac failure. In short, this agent should be avoided whenever the intake or distribution of oxygen is impaired. It is contraindicated in traumatic shock or in conditions of impending shock.

Complications encountered are those of barbiturates in general, especially respiratory depression, hypoxia, laryngospasm, hypotension, and excitement. The drug should be employed only by anesthetists familiar with the signs of anesthesia peculiar to intravenous barbiturates and the precautions in the use of these agents.

Dosage.—Intravenously, an initial injection of 3 to 6 cc. of a freshly prepared 2.5% solution is sufficient to produce short periods of anesthesia. The rate of injection during induction should be 1 cc. every five seconds, and, as indicated, additional injections of 0.5 to 1.0 cc. are made intermittently with the needle remaining in the vein. The maximum total dose should not exceed 1 gm. (40 cc. of a 2.5% solution). As a supplement to other forms of anesthesia, the drug may be administered by continuous intravenous drip as either 0.2 or 0.3% solution. When preliminary medication has been given, induction should be delayed 30 to 45 minutes to permit this to attain its full effect.

Rectally, for diagnostic procedures in children, a 5% solution is used, the dosage being based upon 0.8 to 1.0 gm. per 50 lb. (22.7 kg.) of body weight.

Tests and Standards.—

The acid, thiamylal, used in the preparation of thiamylal sodium responds to the following tests and standards.

Physical Properties: Thiamylal is a light yellow to white, lumpy powder with an aromatic odor and a slightly bitter taste. It melts between 130 and 134°. One gram of thiamylal is soluble in about 4.0 ml. of alcohol, 87 ml. of benzene, 4.6 ml. of chloroform and 3.3 ml. of ether. It is soluble in solutions of alkali hydroxides and practically insoluble in water. The pH of the saturated aqueous solution is about 5.4.

Identity Tests: Heat about 0.2 gm. of thiamylal in a test tube with about 0.2 gm. of anhydrous sodium carbonate: a strip of moistened red litmus paper held in the mouth of the test tube turns blue *(presence of nitrogen).*

Dissolve about 20 mg. of thiamylal in 0.3 ml. of sodium hydroxide T.S., heat just to boiling, and add 2 ml. of water and 2 drops of sodium nitroprusside T.S.: a red color develops *(test for substituted thiobarbituric acids and distinction from thiobarbituric acid and barbituric acids).*

Shake about 0.1 gm. of thiamylal with 5 ml. of carbon tetrachloride for 1 min. in a 10 ml. glass-stoppered cylinder and filter the mixture. To the filtrate add 0.25 ml. of 5% bromine in carbon tetrachloride and shake vigorously: the bromine color disappears rapidly *(presence of unsaturated side chain).*

Purity Tests: Dry about 1 gm. of thiamylal, accurately weighed, for 4 hours at 80°: the loss in weight is not more than 0.3%.

Ignite about 1 gm. of thiamylal, accurately weighed: the residue is not more than 0.05%.

Assay: (Thiamylal) Dissolve about 0.5 gm. of thiamylal, accurately weighed, in 25 ml. of previously neutralized alcohol. Dilute with an equal volume of water previously boiled to remove carbon dioxide and titrate with 0.1 *N* sodium hydroxide using thymolphthalein T.S. as an indicator. Each milliliter of 0.1 *N* sodium hydroxide is equivalent to 0.02544 gm. of thiamylal. The amount of thiamylal present is not less than 98.5 nor more than 101.5%.

Dosage Forms of Thiamylal Sodium

POWDER. *Physical Properties:* Thiamylal sodium (in admixture with sodium carbonate) consists of pale yellow, hygroscopic, agglutinated masses of crystals with no pronounced odor. It is freely soluble in water. The pH of a 2.5% solution is about 10.8.

Identity Tests: Place about 25 mg. of thiamylal sodium in a 100 ml. beaker and dissolve it in 25 ml. of water. Stir the solution while adding diluted hydrochloric acid until the thiamylal is precipitated completely. Allow the beaker to stand for 15 min. Filter the mixture, wash the residue with several small portions of water, press the filter paper between the folds of a clean towel, transfer the residue to a watch glass and dry it at 60° for one hour. The thiamylal obtained melts between 130 and 134°, and responds to the identity tests described in the monograph for Thiamylal Sodium.

Purity Tests: Prepare a 2% solution of thiamylal: it is bright yellow and free of haze, floaters, and other foreign particles.

Dry about 1 gm. of thiamylal sodium, accurately weighed, for 18 hours in a vacuum at 56°: the loss in weight is not more than 1.0%.

Assay: (Thiamylal Sodium) Dissolve about 1 gm. of thiamylal sodium, accurately weighed, in about 60 ml. of water in a 100 ml. volumetric flask. Shake well to effect solution and dilute to the mark with water. Transfer to a 125 ml. separatory funnel a volume of solution, accurately measured, equivalent to about 0.25 gm. of thiamylal sodium. Acidify with 5 ml. of diluted hydrochloric acid while swirling the mixture. Extract the liberated thiamylal with five 20 ml. portions of chloroform and filter each portion through a pledget of cotton. Rinse the cotton with two 10 ml. portions of chloroform. Evaporate the combined chloroform extracts and washings under a current of warm air (but not over steam) to a volume of about 5 ml. Remove the rest of the chloroform on a steam bath while swirling the contents of the beaker. Dry the residue at 60° for one hour and weigh it. Each gram of thiamylal obtained is equivalent to 1.086 gm. of thiamylal sodium. The amount of thiamylal sodium present is not less than 94.0 nor more than 96.0%.

Powder Surital Sodium: 1 gm. Steri-Vials packaged with or without diluent. U. S. Patents 2,153,712 and 2,153,729. U. S. Trademark 500,405, Parke, Davis & Company, Detroit.

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VOLUNTARY PENSIONS FOR PHYSICIANS

Elsewhere in this issue (page 391) is an analysis of the Keogh-Reed bills (H. R. 4371 and H. R. 4373), which would encourage by tax deferment a voluntary pension system. This article is an abstract of the testimony given on May 13, 1952, in Washington at the hearings of the House Committee on Ways and Means by Frank G. Dickinson, Ph.D., for the American Medical Association. Similar encouragement is now given to employed persons under Section 165 and related sections of the Federal Internal Revenue Code. An editorial on this subject appeared in THE JOURNAL recently,[1] but it did not present an analysis of what might reasonably be expected under the terms of the bill in the matter of pensions. The current article provides that analysis for the benefit of physicians, professional persons generally, and those interested in the pension plight of the self-employed.

On the basis of recent surveys by the United States Department of Commerce of the incomes of physicians, lawyers, and dentists, it has been estimated that the average monthly pension starting at age 70 that could be reasonably expected under this bill would be $208 for physicians, $146 for lawyers, and $140 for dentists. If the proposed past-service credits feature were adopted by the Congress the average expected pension starting at age 75—not age 70—for those now aged 56 would be $131 per month for physicians, $121 for lawyers, and $72 for dentists. The tax savings resulting from deferring the taxes to the low income retired years would probably not average more than one-fifth of these annuities.

As a result of his analysis, the Director of the Bureau of Medical Economic Research expresses the view that the loss in revenues to the Treasury Department will be moderate. They will be small in comparison with the amounts now being excluded by employers for the financing of approved pension plans for their employees. He also points out to those who labeled this bill a "rich man's" bill that under employer pension systems the amounts contributed by the employer are greater for the higher paid employees than for the lower paid employees. Most persons are well past 40 years of age and approaching the peak earning period of their lives before they think seriously about setting aside some of their income for retirement purposes. This greater prospective use of the bill by older professional persons is a phenomenon of age rather than of higher income. For persons in the same age group Dickinson expresses the view that the propensity of the professional man and his wife to save for old age will probably be the major factor in determining their decision to exclude from current taxable income the maximum percentage of their earned income permitted under this bill. For these reasons it is apparent that the charge of critics that this is a "rich man's" bill are not well founded.

1. J. A. M. A. **148**: 1279 (April 12) 1952.

LIPOGENESIS

Both the livestock industry and the medical profession have a real interest in the transformation of nonfat food materials into body fat in the organism. The various factors involved in this fundamental biochemical change have received more or less continuous attention over the years. Endocrine dysfunction has long been known to influence the deposition of fat, and the chemical makeup of food fats is known to condition, to a considerable extent, the character of depot lipids.[1]

It is only within comparatively recent years, however, that more precise knowledge regarding the mechanism of the biosynthesis of body fat has been secured. Employing acetic acid with isotopic carbon and hydrogen, Rittenberg and Block [2] showed that this two-carbon compound was used by the organism in the formation of the long-chain fatty acids that are typically found in animal fats. More recently, further light has been thrown on this phenomenon [3]; laboratory rats were given isotopically labeled (C^{14}) myristic acid, and the saturated and unsaturated fatty acids of the carcass fat were examined and identified. The distribution of radioactive carbon indicated that the myristic acid that had been fed was utilized for the synthesis of palmitic acid, a higher homologue that is one of the characteristic fatty acids of animal fat. The studies showed that carbon atoms 3 to 16 came from the myristic acid, whereas carbons 1 and 2 were provided by acetic acid. There was evidence, too, that part of the isolated palmitic acid arose from two-carbon units (acetic acid) in the course of the biosynthesis.

Further light on the influence of hormones on lipid synthesis has recently been shed through in vitro experiments. It has been known that liver slices of normal animals will synthesize fatty acids when incubated in a nutrient medium containing acetate, whereas liver slices from animals subjected to pancreatectomy have largely lost this capacity. These observations have been extended [4] to include other hormones. Whereas pancreatectomy alone inhibits the formation of fat by the liver slices of the experimental animal, simultaneous hypophysectomy is followed by normal lipogenesis, as shown by the incorporation of C^{14} from the labeled acetate into the fatty acids of body fat. Purified anterior pituitary growth hormone injected into animals subjected to hypophysectomy and pancreatectomy resulted in a profound inhibition of lipogenesis by the liver, and cortisone administered to intact animals has the same effect. In normal animals, injected insulin favored in vitro lipogenesis

1. Anderson, W. E., and Williams, H. H.: Rôle of Fat in Diet, Physiol. Rev. **17**: 335, 1937.
2. Rittenberg, D., and Block, K.: Utilization of Acetic Acid for Fatty Acid Synthesis, J. Biol. Chem. **154**: 311, 1944.
3. Anker, H. S.: On the Mechanism of Fatty Acid Synthesis in Vivo, J. Biol. Chem. **194**: 177, 1952.
4. Brady, R. O.; Lukens, F. D. W., and Gurin, S.: Synthesis of Radioactive Fatty Acids in Vitro and Its Hormonal Control, J. Biol. Chem. **193**: 459, 1951.

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by liver tissue, whereas growth hormone and cortisone depressed the synthesis of fat.

The foregoing observations emphasize anew the enormous significance of metabolites of simple constitution (like acetate) in biologic synthetic activity. And the refinement of the knowledge of the details of hormone intervention in metabolism should ultimately be of practical value to the internist.

THE DURHAM-HUMPHREY AMENDMENT

The Durham-Humphrey amendment to the Federal Food, Drug, and Cosmetic Act became effective on April 26 of this year. This amendment to the law contains a specific requirement relating to the labeling of drugs that move in interstate commerce as well as provisions that affect prescription practice.

Drugs that cannot be used with relative safety in self-medication must bear the legend "Caution: Federal law prohibits dispensing without prescription" on their labels. The pharmacist is liable to prosecution if he makes an over-the-counter sale of any such drug to a customer without obtaining a bona fide prescription or oral authorization from a licensed practitioner. Moreover, the pharmacist who refills prescriptions for such drugs without the authorization of the prescribing physician is violating the law. The Durham-Humphrey amendment also provides that prescriptions for drugs that can be sold legally over the counter may be refilled by the pharmacist at his own discretion.

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Undoubtedly many physicians now receive a considerably increased number of telephone calls from pharmacists requesting necessary authorization to refill prescriptions for those drugs that cannot be legally sold over the counter. The medical profession has no cause to complain in this regard. It is the duty as well as the prerogative of the physician to determine whether the refilling of a prescription is in the best interests of his patient. Physicians can frequently obviate needless waste of their own time as well as that of the pharmacist and the patient by indicating their specific desire with respect to refilling when they write the original prescription.

INSECTICIDE VAPORIZERS—HELP OR HAZARD?

The use of electrical devices for the intermittent or continuous dispersion of insecticides into the atmosphere of commercial establishments and homes has become popular in the last few years because of the convenience and simplicity of these devices in the control of flying insects. Developmental data obtained under controlled conditions with certain of the machines indicated that amounts of poison were dispensed that neither deposited in significant quantities on exposed surfaces nor accumulated in the atmosphere of properly ventilated areas sufficiently to cause injury to humans exposed for ordinary working periods.

It was found under practical conditions of use, however, that the laboratory standards for safe and effective performances were not being duplicated in practice. Poor construction and installation of units, tampering to effect greater control, overheating that resulted in excessive output, substitution of chemicals and formulas other than those recommended, installation in homes where overexposure of young children was likely, and a variety of other abuses have occurred. These are fostered in part by exaggerated claims for efficiency and harmlessness and in part by a growing tendency of users to increase the output of the machines in order to control resistant strains of insects. While technically constituting misuse, such situations are measures of the common method of use that may be expected to continue with the great majority of devices presently employed.

Concerted effort to control these particular abuses has been undertaken to solve the more urgent problems associated with the growing use of insecticide vaporizers. Of equal if not of greater importance are those difficulties that may arise from long-term or repeated subclinical exposure. It is for these reasons that a report of the Committee on Pesticides on this subject appears elsewhere in this issue of THE JOURNAL.

EDUCATION BY PRESSURE GROUPS

The concept of healthful living held by small pressure groups has influenced the curriculum of the public schools ever since personal and community health were first considered suitable material for our children to study. These pressure groups learned early that if they could "get a law" they could dictate what would be taught or the manner of its teaching, regardless of the validity of the facts or hypotheses involved.

A new interference with the free teaching of the facts and accepted hypotheses relating to personal and community health has recently been enacted into law by several states and may be considered by others. In New York the 1950 Legislature amended section 3204, chapter 135, of the statutes by adding subdivision 5, which reads: "Subject to the rules and regulations of the Board of Regents, a pupil may be excused from such study of health and hygiene as conflicts with the religion of his parents or guardian. Such conflict must be certified by a proper representative of their religion as defined by section two of the religious corporations law." The State Commissioner of Education has approved the exemption of the children of a certain religious faith from instruction in the units of disease prevention and control.

These children will get no instruction in such areas as the building of resistance to disease; the understanding of current health problems, both public and private; measures used to prevent the spread of communicable diseases, the importance of heart disease, cancer, diabetes, diphtheria, typhoid, tuberculosis, and poliomyelitis; the role of insects in the transmission of disease; the relation of sanitary control of water and food to public health; war conditions and the problem of disease control and prevention; what bacteria are; the home care of the sick; first aid treatment; and much else.

In addition to excusing certain children from attending classes while "undesirable" information is being taught to their colleagues, the Commissioner directs that "required sections of the Regents Examination as well

as the State Scholarship Examinations will be so constructed so as not to penalize pupils who have been excused from instruction in the specified units of study." Thus, deemphasis and virtual elimination of these topics looms for all children because they are not acceptable to a few children, and the gains of a half century in health education will be lost.

The California Education Code 1949, section 10302, prescribes the course of study including training for healthful living—"provided, however, that whenever any part of the 'training for healthful living' conflicts with the religious beliefs of the parent or guardian of any pupil, then on written request of the parent or guardian the pupil may be excused from the part of the training which conflicts with such religious beliefs." Similar provisions exist in other states.

The attainment of a high level of scholarship in the sciences is the privilege of those capable of such attainment. Those who are capable but choose to waive their privilege by being absent from classes in health and hygiene have every right to select studies more to their liking; however, those who wish to shun these subjects have no right to create situations that prevent those who wish to study them from exercising the privilege which is theirs. The Regents Examinations of New York, and similar tests of ability in other states, should include questions in health, hygiene, and healthful living that everyone should be expected to answer. The inability of certain persons to answer is a deficiency of their own choosing. A knowledge of healthful living is part of the working information of every educated man. No person should be deprived of the opportunity for a well-rounded education because some persons wish to restrict their learning without accepting the inevitable consequences. No person should be deprived of the privilege of being examined on all of the subjects he has studied, so that he may have a true evaluation of the level of scholarship he has attained.

Religious beliefs must be respected. We can defend a person's right to hold an opinion contrary to the opinion of the majority and the demonstrable facts of biological science. We can defend a person's right to contract and suffer unnecessary illness resulting from his intentional ignorance of accepted disease control practices, if he so elects; we cannot, however, defend a person who spreads his illness to others through ignorance or forces his ignorance of disease prevention techniques on others through legislation or administrative order. To deprive children of an understanding of these basic facts of community living, whether they wish to believe them or not, will soon develop an uninformed and unprotected public unable to defend itself from epidemic and endemic disease.

The future health of our citizens, and our preservation in time of war, depend in part on public understanding of the disease control measures practiced by our physicians and health departments. Physicians, more than any other persons, know the importance of teaching the basic facts of life and living, bacteriology, disease control, sanitation, and human biology in the public schools. They should advise their legislators on the validity of the proposed changes in what is to be taught our children about health protection. Only in this way can we be sure the advances in community health protection will continue. Individual parents may elect to keep their children ignorant of the facts of life and living, but no one, legislator or administrator, has the right to deny this knowledge to the children of others. Our schools must continue to teach scientific fact, and physicians, as informed citizens, bear a responsibility for continued sound health education.

FERTILIZATION OF TRANSFERRED OVA

An interesting approach to the problem of sterility is presented by Noyes,[1] who recently reported the successful transfer, fertilization, and growth to normal young of ova removed from ovarian follicles of donor rats and transferred into the ovarian bursas of recipients. Maturing ovarian follicles of black donor female rats were pierced under saline solution and their contents expressed. Each cumulus with its ovum was dissected free from the surrounding mural granulosa. Some of the ova were used for histological purposes; the remainder were counted, picked up with a capillary pipet, and transferred to the ovarian bursa of a previously mated albino female. The recipient mother was then permitted to go to term, at which time the young were counted. Fetuses developing from the transferred ova could be distinguished by their eyes, which were darker than those of the fetuses ovulated by the recipient. Their development and vigor appeared entirely normal.

A correlation between histological examination and transfer experiments indicated that follicular ova transferred before the onset of maturation division did not develop into young when transferred to the inseminated recipients and that more ova were successfully fertilized at the first polar body phase, i. e., six to four hours before ovulation, than before or after this time. It was also noted that, although the number of ova transferred varied from 6 to 10, the maximum number of hybrid young obtained was 4. This was apparently not the result of damage to the transferred ova, since the data show that more young were carried in the experimental cornu than in the control cornu and the transferred ova had at least as good a chance as the normally ovulated ova. Furthermore, the uterine capacity would not seem to be the limiting factor, since in superovulated animals more than double the average litter may be carried to term. Noyes tentatively suggests that the cause may be relative progesterone deficiency, since this technique results in an unphysiological preponderance of ova compared with corpora lutea.

Noyes thinks these findings might ultimately prove of significance in studies of human infertility. After reviewing possible methods by which ripe human follicular ova might be obtained, including the perfusion of human ovaries in vitro, he emphasizes that other problems involving sperm, fertilization, growth, and implantation remain to be solved before pregnancy can be successfully induced by transferring human ova.

1. Noyes, R. E.: Fertilization of Follicular Ova, Fertil. & Steril. 3:1, 1952.

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ORGANIZATION SECTION

ANNUAL A. M. A. MEETING TO BE TELEVISED

Two half-hour network telecasts of the 101st Annual Session of the American Medical Association in Chicago, June 9-13, will be presented. Mobile television cameras will transmit the news to the nation as medical authorities report on the latest developments in the field of medicine.

The programs will be carried on 36 NBC television stations at 8:30 p. m. (C.D.S.T.) Tuesday, June 10, and on 15 NBC television stations at 9:00 p. m. (C.D.S.T.) Wednesday, June 11. The sponsor will be the Smith, Kline and French Laboratories of Philadelphia, in cooperation with the American Medical Association.

The telecasts will also present some of the highlights of the hundreds of scientific exhibits to be displayed at the Navy Pier in Chicago. Among other presentations will be symposiums on heart and blood vessel diseases, obesity and diabetes, and methods of lifesaving.

Local time and station schedules of the telecasts will be found on advertising page 25 in this issue of THE JOURNAL.

DR. BAUER'S INAUGURAL ADDRESS TO BE BROADCAST NATIONWIDE

Both the ABC and Mutual networks will broadcast the presidential inaugural address of Dr. Louis H. Bauer at 7:30 p. m. (C.D.S.T.), Tuesday, June 10, during the 101st Annual Session of the American Medical Association in Chicago. Originating from the Grand Ballroom of Chicago's Palmer House, the broadcast will be part of a special meeting of the House of Delegates. Physicians, their families and guests are cordially invited. Doors open at 7 p. m.

STATE MEDICAL LEGISLATION

Massachusetts

Bills Introduced.—H. 916, proposes to authorize a committee on the judiciary to make an investigation and study relative to the evidential value of certain **blood tests** in connection with the trial of persons charged with operating a motor vehicle **while under the influence of intoxicating liquor.** H. 2358, relating to the powers and duties of the state board of vocational education, proposes that **rehabilitation facilities** shall include medical, surgical, hospital, prosthesis, vocational, educational, and physical restoration services and directs the state board of vocational education to establish a list of physicians qualified to render competent rehabilitation services.

Bill Enacted.—H. 2207, has become Res. Ch. 38 of the Resolves of 1952. It revives and continues for the purpose of continuing its study a special commission established to study the advisability of **establishing a medical and dental school** under the auspices of the University of Massachusetts to be located in the city of Boston.

Michigan

Bills Enacted.—H. 165, has become Public Act No. 237 of the Acts of 1952. It authorizes the department of welfare to inspect and **license convalescent homes and homes for the aged** and to enforce, through use of the injunctive process, any reasonable orders fixing minimum standards for the care and supervision, personnel, sanitation, fire protection, food, and comfortable lodging of such institutions. S. 144, has become Public Act No. 266 of the Acts of 1952. It restricts the **sale of narcotic drugs** to persons licensed to sell them and defines the term narcotic as including cocaine, opium, morphine, codeine, heroin, chloral hydrate, all parts of the plant Cannabis sativa and any substance or synthetic narcotic drug which the bureau of narcotics of the United States treasury department has designated as "narcotic."

New Jersey

Bills Enacted.—A. 207, has become Ch. 119 of the Laws of 1952. It authorizes the board of freeholders of any county not having a mental or psychiatric hospital to appropriate money for the necessary expense incident to the diagnosis and treatment of such indigent residents of the county as may require **psychiatric diagnosis and treatment,** including the cost of diagnosis, special mental tests, and treatment. A. 306, has become Ch. 137 of the Laws of 1952. It amends the pharmacy act so as to require **proper labeling and filing of prescriptions** and requires every registered pharmacist who fills a prescription to place his name or initials upon the original prescription or on the label affixed to the container in which the prescription is dispensed or in a book kept for the purpose of recording prescriptions and authorizes the board of pharmacy or its agents to inspect the prescription files of pharmacists. A. 327, has become Ch. 152 of the Laws of 1952. It authorizes the borad of education to exclude a teacher or pupil who has not been successfully vaccinated but authorizes such board to excuse such person if the person presents a written statement signed by himself, or a guardian of a pupil, objecting to the **vaccination** on the ground that it interferes with the free exercise of his religious principles. A. 329, has become Ch. 153 of the Laws of 1952. It authorizes the board of education of a school district to require immunization to **diphtheria** as a prerequisite to school attendance but also authorizes the board to exempt a pupil from such requirement when the pupil presents a statement from his parents objecting thereto on the ground that the proposed immunization interferes with the free exercise of his religious principles. A. 526, has become Ch. 120 of the Laws of 1952. It authorizes the board of freeholders of any county to establish and maintain a **mental health program** for the operation or the support of centers for the diagnosis and treatment of mental disorders. A. 542, has become Ch. 121 of the Laws of 1952. It makes it a high misdemeanor for any person to hire, employ, or use any child under the age of 18 years to sell, transport, or offer for sale any **narcotic drug.** A. 534, has become Ch. 122 of the Laws of 1952. It authorizes the **revocation of a license to practice medicine** by the state board of medical examiners upon proof that a holder of such license habitually uses drugs. S. 38, has become Ch. 147 of the Laws of 1952. It prohibits a deduction from wages to defray the costs of any **medical examination** required of employees or prospective employees. S. 210, has become Ch. 127 of the Laws of 1952. It authorizes boards of education to employ optometrists licensed to practice within the state as **school vision examiners.**

Prepared by the Bureau of Legal Medicine and Legislation.

A. M. G. A. GOLF TOURNAMENT AT MEDINAH COUNTRY CLUB

The Chicago Committee, headed by Dr. Robert J. Hawkins, has been successful in securing the facilities of the Medinah Country Club for the annual tournament of the American Medical Golfing Association in Chicago. It has three outstanding golf courses, which have often been selected for the National P. G. A. and other famous tournaments. The number three course is one of the outstanding courses in the country. The Chicago Committee will provide entertainment. Several boxing matches and a wrestling match are on the card for June 9th.

How to Get to Medinah

The Committee has arranged for bus service to and from the club on Monday, June 9. Buses will leave the Palmer House at 7 a. m., 8 a. m., 9:30 a. m., and 11 a. m., and will return at appropriate times. The round trip fare is $5.00.

Applications for Memberships

All male members of the American Medical Association are invited to become fellows of the American Medical Golfing Association by executing the application blank below and mailing it to the Secretary, Bob Elwell, 1420 Monroe Street, Toledo 2, Ohio. All fees are payable at the registration desk on June 9th.

American Medical Golfing Association

NAME .....

ADDRESS .....

CITY..... ZONE... STATE.....

SPECIALITY.....

AGE: Under 60 ☐ Over 60 ☐

HOME COURSE.....PAR.....

PLAYER'S CLUB HANDICAP.....

New A. M. G. A. Fellows Check Here ☐

MEDICAL NEWS

CALIFORNIA

Dr. Crowl Honored.—Dr. Verne C. Crowl, a member of the Los Angeles County Medical Association Council, has been honored by the city of Huntington Park by being named its "Outstanding Citizen of 1951," "for his continued and devoted work in YMCA, Kiwanis Youth activity, Chamber of Commerce, and as chief of staff at St. Francis Hospital."

Metabolic Research Laboratory Dedicated.—A laboratory for the study of causes and treatment of chronic diseases has been dedicated at the University of California School of Medicine, San Francisco. The Metabolic Research Laboratory for the study of arthritis and allied diseases was conceived years ago by Dr. William J. Kerr, professor of medicine. In 1950 the state legislature made an appropriation for the establishment of the laboratory. It has been in temporary quarters, with Dr. Leslie L. Bennett, professor of physiology, as acting director. Six beds in the University Hospital were assigned for patients under experimental treatment by the laboratory. Dr. Peter H. Forsham from Harvard University, Boston, has been made director. One function of the laboratory is to serve as a testing ground for new hormone materials, especially those prepared by Choh H. Li, Ph.D., professor of biochemistry on the Berkeley campus.

Health Workshop.—A workshop for teachers and students of health will be conducted June 23 to July 3 by the University of California School of Public Health, Berkeley, and the University Extension, with the cooperation of the California State Civil Defense Organization. This session, designed to provide appropriate objectives and scientific materials for instruction of college and high school students, will stress the importance of integrating disaster planning with the community health program. The undertaking has been endorsed by state departments of education, public health, and civil defense in most of the mountain and Pacific states. The course will consist of lectures, field trips, and demonstrations. Two units of credit will be given to persons fulfilling all workshop requirements. The registration fee of $30 covers transportation for the field trips and demonstrations and a portfolio of printed and mimeographed materials, including a complete syllabus, film lists, reading references, sets of examination questions, and other teaching aids, and provides for the loan of projection equipment for group use and of numerous films for review. Veterans may apply for federal benefits if the workshop is a part of their prescribed and recognized objectives approved by the Veterans Administration. Supplemental certificates of eligibility from the Veterans Administration must be dated on or before June 23 and must cover the fee in full. For information, write to the Department of Conferences and Special Activities, University Extension, University of California, Berkeley 4.

CONNECTICUT

Society News.—At the annual meeting of the Connecticut Association of Pathologists May 1, Dr. Roy N. Barnett, Norwalk, was reelected president and Dr. John E. Thayer, Hartford, secretary-treasurer.

Dermatological Association Prize Essay.—At the meeting of the American Dermatological Association, held in Colorado Springs, Colo., April 23-26, first prize in the annual essay contest was awarded to Dr. Paul D. Rosahn, New Britain, Conn., for his paper on "The Adverse Influence of Syphilitic Infection on the Longevity of Mice and Men."

Yale Summer School of Alcohol Studies.—Yale University Center of Alcohol Studies, New Haven, announces that the Summer School of Alcohol Studies will be in session from July 7 to Aug. 1. This program is designed to meet the needs of those requiring knowledge and understanding of alcoholic beverages, their functions, and the problems associated with their use. The curriculum emphasizes the need of a broadly oriented background in the biology, psychology, sociology, and history of the phenomena of alcoholic beverages before consideration of specific problems. The school is under the direction of Selden D. Bacon, Ph.D., associate professor of sociology and director of the Center of Alcohol Studies. Requests for information should be addressed to: Summer School of Alcohol Studies, Laboratory of Applied Physiology, Yale University, 52 Hillhouse Ave., New Haven.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education and public health. Programs should be received at least three weeks before the date of meeting.

DISTRICT OF COLUMBIA

Freedmen's Hospital Alumni Meeting.—The annual meeting of the Association of Former Interns and Residents of Freedmen's Hospital, Washington, D. C., will be held at the hospital June 9-12 under the presidency of Dr. Leonidas H. Berry of Chicago.

Personals.—Dr. Charlotte A. Donlan, clinical instructor in radiology at the medical school and radiotherapist at the hospital, recently assumed her new duties as director of the Cancer Detection Clinic of the George Washington University School of Medicine.——Dr. George B. Koelle on May 8 delivered the H. C. Hachmeister Lecture in Pharmacology under the auspices of Georgetown University School of Medicine, Washington, D. C., on "Pharmacological and Therapeutic Significance of Anticholinesterase Drugs."

IDAHO

State Association to Meet at Sun Valley.—The Idaho State Medical Association will hold its annual meeting at Sun Valley June 16-18 under the presidency of Dr. Alfred M. Popma of Boise. Guest speakers and their first presentations include:

Keith S. Grimson, Durham, N. C., Surgery in Industrial Medicine as It Pertains to Ulcers and Hypertension.
John Parks, Washington, D. C., Office Gynecology.
Earl D. McBride, Oklahoma City, Disability Evaluation.
Samuel J. Lang, Evanston, Ill., Evaluation of Disability in Nonsurgical Afflictions of the Back.
L. Henry Garland, San Francisco, Common Errors in X-Ray Diagnosis.
Lewis A. Alesen, Los Angeles, The Physician's Responsibility as a Leader.

ILLINOIS

New Unit for University of Illinois.—The University of Illinois has started construction on a new classroom and laboratory building in the Medical Center District on Chicago's West side, which will permit the colleges of medicine, pharmacy, and dentistry to increase their enrollments. The six story structure at Wood and Polk streets will enable the College of Medicine to increase its enrollment from 166 to 190 students in each class. The College of Pharmacy will be able to increase its registration from 125 to 175 students per class, and the College of Dentistry will enroll 90 in each class instead of 80. The graduate college also will be able to accommodate more students in the health sciences.

Chicago

Personal.—Miss Gratia Esher Knobel, for many years executive secretary of the Institute of Medicine of Chicago, died at her home in Evanston March 19. Miss Margaret L. Plumley has been appointed to succeed Miss Knobel.

Dr. Arthur Abt Appointed Professor at Duke.—Dr. Arthur F. Abt has accepted an appointment as professor of pediatrics at The Duke University School of Medicine and as director, radio isotope unit, for the Veterans Administration Hospital at Durham, N. C., now nearing completion. Dr. Abt has practiced pediatrics in association with his father, Dr. Isaac A. Abt, since 1926. He has served on the board of the Infant Welfare Society; as consultant for the State of Illinois to the Nutrition Service, Municipal Social Hygiene Clinic; member of the Poliomyelitis

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Aid Team, National Foundation for Infantile Paralysis; and a member of the Joint Maternal Welfare Committee of Cook County, Ill. He was lecturer on infectious diseases for the Chicago Tuberculosis Institute, attending physician for cardiac children in the Chicago public schools, and consultant in pediatrics to the Chicago Maternity Center. Dr. Abt was Pediatric Section representative to the Scientific Exhibits of the American Medical Association in 1939-1942, a member of the Council of the Chicago Medical Society, and past president of the Chicago Pediatric Society. He served with the Navy Medical Corps during World War II, has been on the staffs of St. Luke's Hospital, Sarah Morris Children's Hospital of Michael Reese Hospital, Chicago Lying-In Hospital, and Wesley Memorial Hospital of Chicago. He has been a member of the pediatric department of Northwestern University Medical School since 1926.

MASSACHUSETTS

Dr. Beecher Honored.—Dr. Henry K. Beecher of Boston has been made a Chevalier of the Legion of Honor by the President of France. The presentation was made by the consul general of Boston, M. Chambon, with the following citation: "Dr. Henry K. Beecher, professor of research in anesthesia at the Harvard Medical School, has rendered invaluable services to the science of medicine by his remarkable achievements in the field of his research. By his development of synthetic agents to replace morphine, he has moreover made an eminent contribution toward the relief of pain and earned the gratitude of all peoples. France is in the front line of those who feel called on to recognize publicly Dr. Beecher's services."

MICHIGAN

Personal.—Dr. Ruth E. Wagner of Royal Oak recently received the Chamber of Commerce's annual award of merit as the person who had given most unselfishly to the service of the community.

Conference on Health Statistics.—The second Conference on Public Health Statistics offered by the University of Michigan will be held at Ann Arbor, June 16-20. The meeting is designed to bring health officers, health program directors, and statisticians up to date on their common problems. After a review of the old techniques and methodology of public health statistics in their application to modern public health problems, a full day will be devoted to outlining the newer methods of using sampling techniques, particularly as applied to surveys of human populations.

Venereal Disease and Tuberculosis Surveys.—To determine the extent of venereal disease and tuberculosis in high incidence areas, the state health department and the Detroit Health Department are sponsoring a special detection project, which will end July 15. Areas to be surveyed are selected on the basis of known high incidence of venereal disease as determined by records of the Detroit Health Department. It is assumed that these areas will also have a high incidence of tuberculosis. Plans call for establishment of from 30 to 60 stations for taking blood samples of about 75,000 persons. Mobile x-ray units will be placed in operation in conjunction with the blood sampling stations so that chest roentgenograms can be obtained of the same persons who volunteer for the blood tests. Blood samples will be sent to the state health department laboratories for analysis, and the roentgenograms will be processed in the division of tuberculosis and venereal disease control. Positive venereal disease findings will be reported to the Detroit Social Hygiene Clinic. Indigent persons found to have venereal disease will be treated by the clinic; others will be referred to practicing physicians.

MISSOURI

Anesthesiologists Elect Officers.—At the annual meeting of the Missouri Society of Anesthesiologists held in St. Louis on March 30 Dr. Harold J. Freiheit of St. Louis was elected president; Dr. L. G. Johnson of Springfield, vice-president; Dr. Jean J. Merz of St. Louis, secretary; and Dr. A. Lester Saferstein of Kansas City, treasurer.

Institute of Biophysics.—St. Louis University announces the establishment of an Institute of Biophysics under the direction of Basile J. Luyet, D.Sc. Grants totaling $13,880 were recently awarded to Professor Luyet: $6,120 from the Public Health Service of the Federal Security Agency for a study of "Mode of Action of Glycerol in the Preservation of Life in Frozen Cells," $3,800 from the Jane Coffin Childs Memorial Fund for Medical Research for a "Comparative Study of the Survival of Various Embryonic and Adult Tissues After Ultra-Rapid Freezing," and $3,960 from the National Science Foundation for the study of "Survival of Vitrified and Dried Tissues and Organisms."

MONTANA

Lectures on Cancer and Heart Disease.—The Montana Medical Association in cooperation with the state board of health will sponsor a series of cancer lectures in the eastern part of the state. The lectures will be held in Havre, June 2; Wolf Point, June 3; Sidney, June 4; Miles City, June 5; Billings, June 6; and Bozeman, June 7. The guest speaker will be Dr. Frank B. Queen, professor of pathology, University of Oregon Medical School, Portland.——The Montana Medical Association in cooperation with the Montana Board of Health will present a series of heart lectures during the week of June 23, with Dr. Hans H. Hecht, associate professor of medicine, University of Utah College of Medicine, Salt Lake City, as guest speaker. The lectures will be held in Kalispell, June 23; Missoula, June 24; Butte, June 25; Livingston, June 26; Helena, June 27; and Great Falls, June 28.

NEBRASKA

Joint Meeting with Bar Association.—The Lancaster County Medical Society of Lincoln and the Lincoln Bar Association recently held a joint meeting at Lincoln. A clinic on medicolegal topics included: qualifications of the expert witness, criteria for evaluating medical specialists, fact versus opinion in medical evidence, and problems in relation to trauma and cancer and trauma and heart disease. Guest speaker for the occasion was Dr. Alan R. Moritz, director of the Institute of Pathology, Western Reserve University School of Medicine, Cleveland. After a banquet at the Hotel Cornhusker, Dr. Moritz gave an address on "Unexplained Death."

NEW YORK

Society News.—Erie County Medical Society has incorporated in its new by-laws a provision that one member of each committee must have been a member of the society for less than five years.

List of Cancer Detection Centers.—A folder prepared by the New York State Department of Health's Bureau of Cancer Control gives the location of cancer detection centers in New York State (exclusive of New York City), the name of the physician who directs the center, and hours for examination. The folder will be sent free on request directed to the Bureau of Cancer Control, New York State Department of Health, Albany.

Community Nutrition Institute.—Syracuse University and the Bureau of Nutrition, New York State Department of Health, are sponsoring the Community Nutrition Institute at the university, June 16-28. Out-of-state speakers include:

John E. Gordon, Boston, Epidemiology of Nutrition Studies.
Samuel W. Dooley, Boston, Growth and Development Studies.
J. Roswell Gallagher, Boston, Understanding the Adolescent.
William J. Dieckmann, Chicago, Influence of Diet on Maternal and Child Health.
Jean Mayer, Paris, France, Problems of Obesity.

Three hours' credit will be given for the course. The approximate cost for the institute is $120. For information write Prof. Anne Bourquin, Department of Food and Nutrition, College of Home Economics, Syracuse University, Syracuse 10.

New York City

Gift for Children's Pavilion.—The William J. Wollman Foundation will contribute one million dollars for the Children's Pavilion in the new building planned for University Hospital. It is to be a part of the New York University-Bellevue Medical

Center. The date of construction of the 20 story, 600 bed University Hospital has not been set. The Children's Pavilion, to be known as the William J. Wollman Memorial Pavilion, will occupy the 18th floor. It will have 60 beds as well as outpatient facilities.

Greece Honors Dr. Berson.—The Hon. Christopher A. Axelos, consul general of Greece, on April 30 presented to Dr. Morton I. Berson of New York the insignia and diplomas of decorations awarded to him by His Majesty the King of the Hellenes. These honors were bestowed "in recognition of the eminent services which he has rendered in 1950 and 1951 in performing plastic surgery to a great number of servicemen and children badly maimed during the communist guerilla warfare and also several casualties recently returned from Korea."

Personals.—Dr. Joseph Felsen, director of laboratories and research, the Bronx Hospital, attended the Pan-American Medical Week of Gastroenterology and the First National Congress of Gastroenterology in Mexico City, May 11-17. Dr. Felsen, who served as chairman of the meeting on May 15, gave an address on "Fibrocystic Disease of the Pancreas."——Dr. Lester J. Evans, executive associate of the Commonwealth Fund, which is supporting a new program for comprehensive medical care and teaching at the New York Hospital-Cornell Medical Center, was guest speaker at the celebration of the 181st anniversary of the granting of a charter to the Society of the New York Hospital on May 8. Dr. Evans spoke on "The Next Twenty Years in Medicine."

OHIO

New Rh Laboratory.—A laboratory added to the University of Cincinnati Blood Transfusion Service is equipped to perform studies on the various antigen-antibody complexes as they relate to transfusion and pregnancy. While not in competition with commercial laboratories, it offers service at nominal cost and at the request of the practicing physician when problems in pregnancy and paternity occur. Cooperating in the project are the Babies Milk Fund Association and the Maternity Society.

Award to Dr. Kehoe.—Dr. Robert A. Kehoe of Kettering Laboratory, University of Cincinnati College of Medicine, recently received the annual award of the Technical and Scientific Societies Council of Cincinnati. The council pointed out that, because of the dangers to health associated with the use of tetraethyl lead in antiknock gasoline, its manufacture and distribution were voluntarily suspended in the early 1920's, until a plan of safety was developed by Dr. Kehoe after intensive research. The council stated further that his recognition of the need for specialized training of industrial physicians with an appreciation of preventive, rather than curative medicine and with intensive training in frequently neglected phases of toxicology, physiology, pathology, legal medicine, and medicosocial work led to the establishment of the Institute of Industrial Health.

PENNSYLVANIA

Committee Requests Papers.—The 1952 Scientific Work Committee invites submission of voluntary papers for consideration for the scientific program of the Medical Society of the State of Pennsylvania meeting in Philadelphia, Sept. 28 to Oct. 2. Communications should be addressed to Dr. Wendell J. Stainsby, Geisinger Hospital, Danville.

Scholarships for Physicians' Children.—Money from the educational fund of the Medical Society of the State of Pennsylvania is available for children who, after the death or incapacitating illness or injury of the physician parent member of the society, can qualify satisfactorily for college entrance. Copies of the application form may be had by writing to the Educational Fund Committee, Medical Society of the State of Pennsylvania, 8104 Jenkins Arcade, Pittsburgh 22.

TENNESSEE

Grants for Research.—An $18,986 research grant by the Army Medical Service has been awarded to Dr. James D. Hardy, assistant professor of surgery at the University of Tennessee College of Medicine, Memphis. The award will be used to finance a study of thermal burns. Under a $15,163 grant awarded by the Atomic Energy Commission, Richard R. Overman, Ph.D., associate professor of physiology, University of Tennessee Medical Units, Memphis, will study effects of radiation on water and salt balance and cell membrane permeability. Dr. Overman's study is part of a nationwide program by the Atomic Energy Commission, Public Health Service, the Army, and the Navy to determine the hazards involved in exposing men to various doses of radiation on the atomic powered ships and aircraft and from bombs. Dr. Overman will conduct his research in cooperation with Dr. David S. Carroll, assistant professor of radiology.

UTAH

University News.—Dr. John Z. Bowers, dean, University of Utah College of Medicine, on May 1 began a two month leave of absence to serve as a consultant on health education to the Ford Foundation. Dr. Bowers will spend this period in India to evaluate health and medical problems in the villages and to determine the feasibility of a program for health education.——Dr. Maxwell M. Wintrobe, head of the department of medicine, has been named chairman of the Advisory Council of the Life Insurance Medical Research Fund for 1952-1953.——Dr. Glen R. Leymaster, head of the department of public health and preventive medicine, recently returned from a trip sponsored by the Rockefeller Foundation for the study of outpatient medical teaching in the various schools of the country.

VERMONT

Society News.—The section on surgery of the Vermont State Medical Society will meet June 5 at the Woodstock Inn, Woodstock. The speaker, Dr. Arthur MacGregor, Brooklyn, will discuss "Surgical Complications in Pregnancy."

Pediatric Seminar.—The pediatric seminar for practicing physicians, sponsored by the division of maternal and child health of the state Department of Public Health, the University of Vermont College of Medicine, and the Maternal and Child Welfare Committee of the Vermont State Medical Society, will be held May 29 at the college. Guest speakers will be Drs. Stuart S. Stevenson and Robert Klein of the pediatrics department of the University of Pittsburgh School of Medicine.

VIRGINIA

Alumni Day.—Medical Alumni Day will be held at the University of Virginia, Charlottesville, on June 6. Dr. J. William Hinton, professor of surgery of New York University Post-Graduate Medical School, will be guest speaker for the scientific program.

Historical Items Wanted.—Among the objects of historical interest long sought by the Medical Society of Virginia is the seal struck in 1870 at the time of the reorganization of the society. Members are asked for any possible information concerning the seal and to contribute documents, photographs, mementos, or other items of historical interest in connection with the society or the *Virginia Medical Monthly*. These items will eventually be placed on display at 1105 W. Franklin St., Richmond.

WEST VIRGINIA

Diamond Jubilee of Harrison County.—To celebrate the 75th anniversary of the Harrison County Medical Society three special scientific sessions will be held in Clarksburg June 28-30. On Saturday a medical seminar on tumors will be conducted by Dr. Grant E. Ward of Johns Hopkins School of Medicine, Baltimore. On Sunday Dr. Edgar W. Davis of Washington, D. C., will lead a discussion on cardiac diseases and their surgical therapy. On Monday Dr. Charles A. Doan of Columbus, Ohio, will conduct the scientific program on blood dyscrasias. The meeting will close on Monday night with a banquet. The committee in charge of the anniversary invites all West Virginia physicians and their friends from out of the state to attend the three sessions. There is no registration fee.

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National Board Diplomates to Meet in Chicago.—The Associated Diplomates of the National Board of Medical Examiners, now numbering over 24,000, will hold their annual meeting June 11 at 4 p. m. at the Drake Hotel, Chicago, under the presidency of Dr. Willard O. Thompson, Chicago.

Annual Physical Therapy Conference.—The American Physical Therapy Association will meet June 23-28 at the Bellevue-Stratford Hotel, Philadelphia. The program will include symposiums on hand injuries and on neurologic conditions. A pediatric seminar will be held on Tuesday and a panel discussion on electrotherapy on Wednesday.

American Society for the Study of Sterility.—The annual meeting of this society will be held at the Congress Hotel, Chicago, June 7-8, under the presidency of Dr. Fred A. Simmons of Boston. Topics to be discussed are: "Use and Abuse of Endocrines in Infertility," "Psychosomatic Aspects of Infertility," "Male Infertility," and "Clinical Approach to the Infertile Couple." There will be roundtable discussions Saturday from 8 to 10 p. m. and a banquet at the Standard Club Sunday at 9 p. m.

Public Health Meeting in Denver.—The annual meeting of the Western Branch, American Public Health Association, is to be held June 4-6 in Denver under the presidency of Lawrence J. Peterson, M.S.P.H., Boise, Idaho. The keynote speech for the conference will be delivered Wednesday by Dr. Wilton L. Halverson, director, California Department of Public Health. Panel discussions will be held daily. Topics will be "What Services Come First?," "Stimulating Community Action," and "Additions and Subtractions."

Chest Physicians Meeting.—The annual meeting of the American College of Chest Physicians will be held June 5-8 at the Congress Hotel, Chicago, under the presidency of Dr. Chevalier L. Jackson of Philadelphia. There will be panel discussions and roundtable luncheons Friday, Saturday, and Sunday. On Friday at 8 p. m. Dr. Paul H. Holinger, Chicago, will serve as chairman of a motion picture session on diseases of the chest, and on Saturday at 3:30 p. m. Dr. Leo G. Rigler, Minneapolis, will conduct an x-ray symposium. The presidents' banquet at 7:30 p. m. Saturday will be preceded by the annual convocation at 6 p. m. and a cocktail party at 7 p. m.

Meeting of Tuberculosis Physicians.—The American Academy of Tuberculosis Physicians will hold its annual meeting at the Palmer House, Chicago, June 7, under the presidency of Dr. Samuel E. Hughes Jr. of Downey, Ill. A paper on "Lung Resection in the Therapy of Pulmonary Tuberculosis" will be read by Dr. Edgar D. Grady, chief of surgical service, and discussed by Dr. William E. Van Fleit, both of the Veterans Administration Hospital, Chamblee, Ga. Dr. Robert H. Ebert, University of Chicago, will present "The Effects of Cortisone on Tuberculous Infection as Observed in Vivo Using the Rabbit Ear Chamber," with cinema demonstration. Thirteen other papers will be read. At the luncheon at 12:15 p. m. Dr. Francis M. Pottenger will be the honor guest.

Annual Geriatrics Meeting.—The American Geriatrics Society will hold its annual meeting in the Hotel LaSalle, Chicago, June 5-7, under the presidency of Dr. Willard O. Thompson, Chicago. Thirty-four papers will be presented. Individual presentations by invitation will be as follows:

Max M. Montgomery, Chicago, Certain Aspects of ACTH and Cortisone Therapy in Older Patients with Rheumatoid Arthritis.
Wright R. Adams, Chicago, Coronary Artery Disease in the Aged.
Danely P. Slaughter, Chicago, Hormonal Treatment of Inoperable Cancer of the Breast.
Armand J. Mauzey, Chicago, Pelvic Surgery in Elderly Women.
Fredrick H. Falls, Chicago, Treatment of Prolapse of Uterus in Geriatric Patients.
Max S. Sadove, Chicago, Problems Related to Anesthesia in General Surgery.

Dr. LeRoy H. Sloan, Chicago, president-elect of the American College of Physicians, and clinical professor of medicine, University of Illinois College of Medicine, will be the guest speaker at the annual dinner on Thursday at 7:30 p. m.

Endocrine Society to Meet in Chicago.—The annual meeting of the Endocrine Society (formerly the Association for the Study of Internal Secretions) will be held June 5-7 at the Palmer House, Chicago, under the presidency of Gregory G. Pincus, Sc.D., Shrewsbury, Mass. The presidential address on "Some Basic Hormone Problems" will be delivered on Friday at 2 p. m. in the Red Lacquer Room. On Saturday at the same time and place the society will hold a joint session with the American Diabetes Association. Speaking by invitation at this session will be Drs. Lewis B. Woolner and B. Marden Black, Rochester, Minn., John J. Bookman, Stanley R. Drachman, and Louis E. Schaefer, New York. The Banting Memorial Lecture will be delivered at this meeting by Dr. Charles H. Best, Toronto, Canada. Seventy papers will be presented and 72 read by title.

At the annual dinner Friday night the awards of the society will be presented. These include the Ayerst, McKenna and Harrison Fellowship; Ciba Award; Squibb Institute for Medical Research Award; and re-award of the Schering Fellowship for 1951.

Catholic Hospital Meeting.—The Catholic Hospital Association of the United States and Canada will hold its annual convention in the Cleveland (Ohio) Auditorium, May 26-29, under the presidency of the Rt. Rev. Msgr. John J. Healy of Little Rock, Ark. Among the speakers will be the following:

Anthony J. J. Rourke, San Francisco, Accreditation and Efficient Patient Care.
Frank J. Ayd Jr., Baltimore, Types of Cases Which Can Be Cared for in the General Hospital.
Thomas P. Murdock, Meriden, Conn., Mutual Understanding Between Administration, Medical, and Nursing Staffs.
Ambrose P. Merrill, New York, How Much and What Kind of Care Can the General Hospital Give?
Robert W. Heinle, Cleveland, What the Medical School Expects in a Training Program.
Albert J. Tremblay, Toledo, Ohio, What Guides the Intern in Choosing a Hospital?
John J. Grady, Cleveland, What Is the Responsibility of the Medical Staff for the Educational Program?
Herbert E. Appleyard, Cleveland, Providing Financial Support for the Outpatient Department.

Discussion on Medicine in Israel.—Problems and progress of medicine in Israel will be discussed from 4 to 6 p. m. June 12 at the Palmer House in Chicago, under the sponsorship of the American Jewish Physicians' Committee. Leading the discussion will be Dr. Leo M. Davidoff, director, neurologic surgery, Beth Israel Hospital, New York. He will be joined by Dr. Leo G. Rigler, chairman, department of radiology, University of Minnesota Medical School, Minneapolis, and Dr. Morris Fishbein, Chicago, chairman, Committee for Medical Needs of CARE. Israeli medical authorities taking part include Dr. Avigdor Back of the Hebrew University Cancer Laboratories, Dr. Duinya Ben-Dor of the Hebrew University Hadassah Hospital, and Dr. Yehuda Matoth, pediatrician of the Hebrew University Hadassah Hospital. Due to immigration from Oriental countries, the shortage of qualified physicians is now acute, although three years ago Israel had one of the highest ratios in the world of physicians to the population. To help meet the needs, the Israel government in 1949, with the cooperation of the Hebrew University and the American Jewish Physicians' Committee, organized a faculty of medicine at the Hebrew University. In September, 1951, the first class of 63 members who had received preclinical training in European medical schools was graduated.

Dr. Karsner Awarded Gold Headed Cane.—Dr. Howard T. Karsner, Washington, D. C., medical research advisor to the Surgeon General of the Navy, has been awarded the Gold Headed Cane of the American Association of Pathologists and Bacteriologists for services to humanity. Its custodianship lasts throughout the recipient's lifetime.

Dr. Karsner was for 35 years professor of pathology and director of the Institute of Pathology, Western Reserve University, Cleveland. He was selected for custodianship of the Gold Headed Cane for his early work, which included studies of Hodgkin's disease, cancer of the liver, experimental studies of infarction, diseases of the kidney, and studies of anaphylaxis and anaphylactoid phenomena. He has published over 250 papers, including lectures, monographs, and textbooks.

Other American men of medicine who have been honored through custodianship of the Gold Headed Cane by this association are:

Harold C. Ernst, late professor of bacteriology, Harvard School of Medicine, Boston.

William H. Welch, former professor of pathology and dean of the medical faculty, Johns Hopkins University, Baltimore.

Theobald Smith, former professor of comparative pathology, Harvard Medical School, Boston, and director of the Rockefeller Institute for Animal Pathology, Princeton University, Princeton, N. J.

Simon Flexner, former director of the Rockefeller Institute for Medical Research, New York.

James Ewing, former professor of pathology and later professor of oncology, Cornell University Medical College, New York.

Frank B. Mallory, former professor of pathology, Harvard Medical School, Boston, and pathologist at Boston City Hospital.

Ludvig Hektoen, former professor of pathology, University of Chicago, and director of the McCormick Institute for Infectious Diseases, Chicago.

Young Man Missing.—Information concerning the whereabouts of Allen Lehman, senior in electrical engineering at the City College of New York, is urgently sought by his parents, Mr. and Mrs. George Lehman, 8305 20th Ave., Brooklyn 14. Since he may be the victim of amnesia and may apply for or have received medical treatment, the following information is being brought to the attention of THE JOURNAL readers:

Allen Lehman

Age, 21; height 5 ft., 8 in.; weight, 150 lb.; light complexion; small scar under chin; dark brown hair, parted on left side; wears glasses with light colored shell rim. Speaks French; very intelligent; often whistles excerpts from classical music. Carries driver's license; selective service card #SS 50-37-29-846; membership card of American Youth Hostels (AYH); Federal Life and Casualty Hospitalization and Medical Insurance cards; and American Express Travelers checks ($10 denomination). Member of Scout Troop 183 and Explorer Post 177. May be wearing khaki Army woolen pants and field boots with initials "N. F." on inside; "T"-shirt with City College emblem. Last letter postmarked Aug. 8, 1951, from Fort William, Ontario, Canada; intended to hitchhike to Winnipeg and Vancouver, enter the U. S. in Washington, and visit an aunt in Santa Monica, Calif. May have gone to Mexico.

Anyone having information concerning Allen Lehman is urged to communicate with his parents at the above address or to contact them by telephone: ESplanade 2-0644.

Meeting of Health Officials from American Republics.—Health officials from Chile, the Dominican Republic, Ecuador, Mexico, Peru, and the United States met April 25 in Washington, D. C., as representatives of their countries on the executive committee of the Pan-American Sanitary Organization. The meeting was also attended by observers from Argentina, Colombia, France, Guatemala, The Netherlands, and Nicaragua. In an eight day session the delegates reviewed public health activities being carried out in the Western hemisphere with the technical assistance of the Pan-American Sanitary Bureau, regional office for the Americas of the World Health Organization. The delegates elected as chairman of this 16th meeting Dr. Nacianceno Romero of Chile and Dr. Jorge Estrella Ruiz of Peru as vice-chairman. The director of the Pan-American Sanitary Bureau, Dr. Fred L. Soper of New York, reported steady progress in decentralization of the bureau, which now has zone offices in Lima, Rio de Janeiro, Buenos Aires, and Guatemala. Negotiations are underway for a zone office in Mexico. Dr. Soper discussed the yellow fever situation in Central America and Brazil. In Panama, cases were reported in 1948, east of the Canal Zone. The following years saw the disease moving westward through Panama and in 1951 into Costa Rica. At the end of the year, cases were reported in Costa Rica on the Pacific slope of the mountains; and in 1952, additional cases have occurred in this area of Costa Rica and a single case was found in Panama. This would suggest that if a moving infection is involved, it traveled along the Atlantic Coast, crossed the mountains, and then spread in both directions on the Pacific Coast. In Brazil, 3,000 cases were reported in 1951 in the Goyas area, which had outbreaks in 1935 and in 1945. The spread of the disease was much more rapid during the 1951-52 season than during the corresponding spread in 1935. Dr. Soper also outlined the progress of the yaws eradication campaign in Haiti, and indicated that a new agreement extending the campaign for two more years had been signed between the government of Haiti and the World Health Organization. Following the director's report, Dr. Felipe Garcia Sanchez of Mexico gave an account of the intensive campaign against smallpox recently carried out in Mexico, as the result of which not a single case of smallpox was reported during the past year.

FOREIGN

European Congress of Cardiology.—The first European Congress of Cardiology will be held in London, England, Sept. 9-12. The congress, which is being organized by the British Cardiac Society in collaboration with the presidents of the European Society of Cardiology, will be held at the University of London, Bloomsbury, W.C.1. Inquiries should be addressed to the Secretary of the Congress, Dr. K. Shirley Smith, Institute of Cardiology, 35 Wimpole St., London, W.1.

Journées Médicales of 1952.—The Journées Médicales will be held June 7-11 at the Palais des Académies in Brussels, Belgium. On Sunday there will be lectures on new data concerning cancer and pulmonary and osteoarticular tuberculosis. Topics for discussion will include medicine and surgery in children and diagnosis and treatment of meningitis and of alcoholism. Tuesday afternoon lectures will be on leptospirosis, uterine cancer, poliomyelitis, bacterial enzymes and occupational medicine. Monday and Tuesday mornings will be devoted to operative and clinical sessions.

New Hadassah-Hebrew University Medical Center.—Ground will be broken for the new Hadassah-Hebrew University Medical Center in Jerusalem on June 7. The medical center will contain a 430 bed university teaching hospital, a nurses' training school, an outpatient department, and new buildings for the Hebrew University-Hadassah Medical School. It is planned that the new center will not only become an advanced base for medical healing, teaching, and research in Jerusalem and Israel but ultimately make a very positive impact on the health and medical standards of the entire Middle East.

Society News.—The next annual general meeting of the Australian Society of Anaesthetists will be held in Melbourne, Victoria, between Aug. 25 and 29 under the presidency of Dr. Stuart V. Marshall of Sydney. A special invitation has been extended to Americans who can attend.——The Scandinavian Society of Anesthesiologists will hold its annual congress in Stockholm, Sweden, Aug. 8-9. The two main themes for the meeting are "Toxic Reactions and Bi-Effects in the Employment of Anesthetics," and "Curarizing Drugs (Chemistry, Pharmacology, Experimental Physiology)." Notification of attendance should be given by June 1 to the secretary, Dr. Henning Poulsen, Norre Alle 17B. Kobenhavn N., Denmark.

CORRECTION

Treatment of Argyria.—In the answer to the Query and Minor Note on argyria in THE JOURNAL, April 5, 1952, page 1264, the word "ferrocyanide" should read "ferricyanide."

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EXAMINATIONS AND LICENSURE

BOARDS OF MEDICAL EXAMINERS

ALABAMA: *Examination.* Montgomery, June 24-26, 1952. Sec., Dr. D. G. Gill, 537 Dexter Ave., Montgomery 4.

ALASKA:* *Examination.* Juneau. On application in other towns where there are board members. *Reciprocity.* On application. Sec., Dr. W. M. Whitehead, Box 140, Juneau.

ARKANSAS:* *Examination. Regular.* Little Rock, June 5-6. Sec., Dr. Joe Verser, Harrisburg. *Homeopathic.* Little Rock, June 10-11. Sec., Dr. Carl S. Bungart, 105 N. 14th St., Fort Smith. *Eclectic.* Little Rock, June 5-6. Sec., Dr. Frank C. Smith, 2301 Broadway, Little Rock.

CALIFORNIA: *Written.* San Francisco, June 23-26; Los Angeles, Aug. 18-21; Sacramento, Oct. 20-23. Application must be received at least two weeks prior to date of examination. *Oral for Reciprocity Applicants.* San Francisco, June 21; Los Angeles, Aug. 16; San Francisco, Nov. 8. Applicants are requested not to arrange to come to an oral examination until they receive notice from the Credentials Committee. *Oral and Clinical for Foreign Medical School Graduates.* San Francisco, June 22; Los Angeles, Aug. 17; San Francisco, Nov. 9. Sec., Dr. Frederick N. Scatena, 1020 N St., Sacramento.

COLORADO:* *Examination.* Denver, June 10-12. Final date for filing application was May 12. *Reciprocity.* Denver, July 8. Applications accepted through June 9. Sec., Dr. Samuel H. Brown, 831 Republic Bldg., Denver.

CONNECTICUT:* *Regular. Examination.* Hartford, July 8-9. Sec. to the Board, Dr. Creighton Barker, 160 St. Ronan St., New Haven. *Homeopathic.* Derby, July 8-9. Sec., Dr. Donald A. Davis, 38 Elizabeth St., Derby.

DELAWARE: Dover, July 8-10. Sec., Dr. Joseph S. McDaniel, 229 South State St., Dover.

FLORIDA:* *Examination.* Jacksonville, June 29-July 1. Sec., Dr. Homer L. Pearson, 701 Dupont Bldg., Miami.

GEORGIA: Atlanta, June 10-11. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta 3.

GUAM: The Commission on Licensure will meet whenever a candidate appears or submits his credentials. Ex. Sec., Dr. Austin W. Matthis, Agana.

HAWAII: *Examination.* Honolulu, July 14-17. Sec., Dr. I. L. Tilden, 1020 Kapiolani St., Honolulu.

IDAHO: Boise, July 14-16. Sec., Mr. Armand L. Bird, 305 Sun Bldg., Boise.

ILLINOIS: *Examination.* Chicago, June 24-26 and Oct. 7-9. Supt. of Regis., Mr. Charles F. Kervin, Capitol Bldg., Springfield.

INDIANA: Indianapolis, June 1952. Sec., Dr. Paul R. Tindall, 538 K of P Bldg., Indianapolis 4.

IOWA:* *Examination.* Iowa City, June 9-11. Acting Sec., Dr. Walter L. Bierring, 1027 Des Moines St., Des Moines.

KANSAS: Kansas City, June 4-5. Sec., Dr. O. W. Davidson, 864 New Brotherhood Bldg., Kansas City.

KENTUCKY: *Examination.* Louisville, June 3-5. Sec., Dr. Bruce Underwood, 620 S. Third St., Louisville.

LOUISIANA: *Regular.* New Orleans, June 4-6. Sec., Dr. Roy B. Harrison, 1507 Hibernia Bank Bldg., New Orleans 12. *Homeopathic. Subject to Call.* Sec., Dr. F. H. Hardenstein, 1714 Pere Marquette Bldg., New Orleans.

MAINE: Augusta, July 8-9. Sec., Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Examination.* Baltimore, June 17-20. Sec., Dr. Lewis P. Gundry, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, June 17-18. Sec., Dr. John A. Evans, 6029 Bellona Ave., Baltimore.

MASSACHUSETTS: Boston, July 8-11. Sec., Dr. Robert C. Cochrane, Room 37, State House, Boston.

MICHIGAN:* *Examination.* Ann Arbor and Detroit, June 9-11. Sec., Dr. J. E. McIntyre, 100 W. Allegan St., Lansing 8.

MINNESOTA:* Minneapolis, June 17-19. Sec., Dr. J. F. DuBois, 230 Lowry Medical Arts Bldg., St. Paul 2.

MISSISSIPPI: *Examination.* Jackson, June 23-24. *Reciprocity.* Jackson, June 25. Asst. Sec., Dr. R. N. Whitfield, Old Capitol, Jackson.

MISSOURI: *Examination.* St. Louis, June 13-14. Ex. Sec., Mr. John A. Hailey, Box 4, State Capitol Bldg., Jefferson City.

NEBRASKA: *Examination.* Omaha, June 16-18. Director, Mr. Husted K. Watson, Bureau of Examining Boards, Room 1009, State Capitol, Lincoln.

NEVADA:* Carson City, Aug. 4. Sec., Dr. George H. Ross, 112 Curry St., Carson City.

NEW HAMPSHIRE: Concord, Sept. 10. Sec., Dr. John S. Wheeler, 107 State House, Concord.

NEW JERSEY: *Examination.* Trenton, June 17-20. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NEW YORK: Albany, Buffalo, New York and Syracuse, June 24-27. Sec., Dr. Stiles D. Ezell, 23 S. Pearl St., Albany.

NORTH CAROLINA: *Written.* Raleigh, June 16-19; *Reciprocity.* Raleigh, June 17. Sec., Dr. Joseph J. Combs, 419 Professional Bldg., Raleigh.

NORTH DAKOTA: *Examination.* Grand Forks, July 9-11. *Reciprocity.* Grand Forks, July 12. Sec., Dr. C. J. Glaspel, Grafton.

OHIO: *Examination.* Columbus, June 17-20. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus 15.

OKLAHOMA:* *Examination.* Oklahoma City, June 4-5. Sec., Dr. Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.

OREGON:* *Examination.* Portland, July 7-9. Final date for filing application is June 16. Exec. Sec., Mr. Howard I. Bobbitt, 609 Failing Bldg., Portland.

PENNSYLVANIA: *Examination.* Philadelphia and Pittsburgh, July 8-10. Acting Sec., Mrs. M. G. Steiner, 351 Education Bldg., Harrisburg.

RHODE ISLAND: *Examination.* Providence, July 2-3. Administrator of Professional Regulations, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH CAROLINA: *Examination.* Columbia, June 23-24. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

SOUTH DAKOTA:* Rapid City, July 15. Sec., Dr. C. B. McVay, Yankton Clinic, Yankton.

TENNESSEE:* *Examination.* Memphis and Nashville, June 11-12. Sec., Dr. H. W. Qualls, 1635 Exchange Bldg., Memphis.

TEXAS: Fort Worth, June 19-21. Sec., Dr. M. H. Crabb, 1714 Medical Arts Bldg., Fort Worth.

UTAH: *Examination.* Salt Lake City, July 9-11. *Reciprocity.* Salt Lake City, June 20. Asst. Dir., Mr. Frank E. Lees, 314 State Capitol Bldg., Salt Lake City 1.

VERMONT: *Examination.* Burlington, June 16-18. Sec., Dr. F. J. Lawliss, Richford.

VIRGINIA: *Examination.* Richmond, June 12-14. *Reciprocity.* Richmond, June 11. Sec., Dr. K. D. Graves, 631 First St., S.W., Roanoke.

VIRGIN ISLANDS: St. Thomas, June 4-5. Sec., Dr. Earle M. Rice, St. Thomas.

WASHINGTON:* *Examination.* Olympia, July. Sec., Department of Licenses, Mr. Edward C. Dohm, Olympia.

WEST VIRGINIA: Charleston, July. Sec., Dr. N. H. Dyer, State Office Bldg., No. 3, Charleston 5.

WISCONSIN:* Milwaukee, July 8-10. Sec., Dr. A. G. Koehler, 46 Washington Blvd., Oshkosh.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ALASKA: *Examination.* On application. Juneau or other towns in Territory as decided by Board. *Reciprocity.* On application. Sec., Dr. C. Earl Albrecht, Box 1931, Juneau.

ARIZONA: *Examination.* Tucson, June 17. Sec., Mr. H. D. Rhodes, University of Arizona, Tucson.

CONNECTICUT: *Examination.* New Haven, June 14. Address: State Board of Healing Arts, 110 Whitney Ave., New Haven 10.

FLORIDA: Gainesville, June 7. *Examination.* Sec., Mr. M. W. Emmel, Box 340, University of Florida, Gainesville.

IOWA: *Examination.* Des Moines, July 8. Sec., Dr. Ben H. Peterson, Coe College, Cedar Rapids.

MICHIGAN: *Examination.* Detroit and Ann Arbor, Oct. 10-11. Sec., Mrs. Anne Baker, 423 W. Michigan Ave., Lansing.

NEBRASKA: *Examination.* Omaha, Oct. 7-8. Director, Bureau of Examining Boards, Mr. Husted K. Watson, 1009 State Capitol Bldg., Lincoln.

OREGON: *Examination.* Portland, June 7, Sept. 6 and Dec. 6. Sec., Dr. Charles D. Byrne, State Board of Higher Education, University of Oregon, Eugene.

RHODE ISLAND: *Examination.* Providence, Aug. 13. Administrator of Professional Regulations, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH DAKOTA: Vermillion, June 13-14. Sec., Dr. Gregg M. Evans, 310 E. 15th St., Yankton.

TEXAS: *Examination.* Austin, October. Sec., Brother Raphael Wilson, 407 Perry-Brooks Bldg., Austin.

WISCONSIN: *Examination.* Milwaukee, June 7 and Sept. 13. Sec., Mr. W. H. Barber, Ripon College, Ripon.

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* Basic Science Certificate required.

MEETINGS

American Medical Association, Chicago, June 9-13. Dr. George F. Lull, 535 North Dearborn St., Chicago 10, Secretary.

AMERICAN ACADEMY OF TUBERCULOSIS PHYSICIANS, Chicago, June 7. Dr. Oscar S. Levin, P. O. Box 7011, Denver, Secretary.

AMERICAN ASSOCIATION OF GENITO-URINARY SURGEONS, Seaview Country Club, Absecon, N. J., June 19-21. Dr. Norris J. Heckel, 122 South Michigan Ave., Chicago 3, Secretary.

AMERICAN ASSOCIATION ON MENTAL DEFICIENCY, Hotel Bellevue-Stratford, Philadelphia, May 26-31. Dr. Neil A. Dayton, P. O. Box 96, Willimantic, Conn., Secretary.

AMERICAN BLOOD IRRADIATION SOCIETY, Conrad Hilton Hotel, Chicago, June 7-8. Dr. H. T. Lewis, 5230 Center Ave., Pittsburgh, Secretary.

AMERICAN COLLEGE OF CHEST PHYSICIANS, Congress Hotel, Chicago, June 5-8. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago, Executive Secretary.

AMERICAN DIABETES ASSOCIATION, Drake Hotel, Chicago, June 7-8. Dr. J. A. Reed, 11 West 42d St., New York 36, Secretary.

AMERICAN GERIATRICS SOCIETY, Hotel LaSalle, Chicago, June 5-7. Dr. Malford W. Thewlis, 25 Mechanic St., Wakefield, R. I., Secretary.

AMERICAN HEARING SOCIETY, Chicago, June 28. Mrs. Francis E. Lee, 817 14th St. N.W., Washington 5, D. C., Secretary.

AMERICAN MEDICAL WOMEN'S ASSOCIATION, Chicago, June 8. Dr. Lucille Marsh, 1168 Briarcliff Road, N.E., Atlanta, Ga., Corresponding Secretary.

AMERICAN OPHTHALMOLOGICAL SOCIETY, Hot Springs, Va., June 5-7. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

AMERICAN ORTHOPEDIC ASSOCIATION, London, England, June 30-July 4. Dr. C. Leslie Mitchell, Henry Ford Hospital, Detroit 2, Secretary.

AMERICAN PROCTOLOGIC SOCIETY, Milwaukee, June 4-7. Dr. Stuart T. Ross, 131 Fulton Ave., Hempstead, L. I., N. Y., Secretary.

AMERICAN RADIUM SOCIETY, Chicago, June 8. Dr. John Wirth, 635 Herkimer St., Pasadena 1, Calif., Secretary.

AMERICAN RHEUMATISM ASSOCIATION, Conrad Hilton Hotel, Chicago, June 6-7. Dr. William H. Kammerer, 33 East 61st St., New York 21, Secretary.

AMERICAN SOCIETY FOR THE STUDY OF STERILITY, Chicago, June 7-8. Dr. Walter W. Williams, 20 Magnolia Terrace, Springfield 8, Mass., Secretary.

AMERICAN THERAPEUTIC SOCIETY, Blackstone Hotel, Chicago, June 5-8. Dr. Oscar B. Hunter Jr., 915 Nineteenth St. N.W., Washington 6, D. C., Secretary.

AMERICAN TRUDEAU SOCIETY, Hotel Statler, Boston, May 26. Dr. John D. Steele, 1790 Broadway, New York 19, Secretary.

AMERICAN UROLOGICAL ASSOCIATION, Chalfonte-Haddon Hall, Atlantic City, N. J., June 23-26. Dr. Charles H. deT. Shivers, Boardwalk National Arcade Bldg., Atlantic City, N. J., Secretary.

AMERICAN VETERINARY MEDICAL ASSOCIATION, Ambassador Hotel, Atlantic City, N. J., June 23-26. Dr. J. C. Hardenbergh, 600 South Michigan Ave., Chicago 5, Executive Secretary.

CATHOLIC HOSPITAL ASSOCIATION OF THE UNITED STATES AND CANADA, Cleveland, May 26-29. Rev. John J. Flanagan, S.J., 1438 South Grand Blvd., St. Louis 4, Director.

IDAHO STATE MEDICAL ASSOCIATION, Sun Valley, June 15-18. Dr. Robert S. McKeon, 305 Sun Bldg., Boise, Secretary.

MAINE MEDICAL ASSOCIATION, Samoset Hotel, Rockland, June 22-24. Mr. W. Mayo Payson, 142 High Street, Portland 3, Executive Secretary.

MEDICAL LIBRARY ASSOCIATION, Lake Placid Club, Lake Placid, N. Y., June 24-27. Miss Caroline Riechers, 1758 West Harrison St., Chicago 12, Secretary.

MINNESOTA STATE MEDICAL ASSOCIATION, Minneapolis, May 26-28. Dr. B. B. Sousler, 496 Lowry Medical Arts Bldg., St. Paul 2, Secretary.

NATIONAL TUBERCULOSIS ASSOCIATION, Copley Plaza and Statler Hotels, Boston, May 26-30. Mr. Kemp D. Battle, 1790 Broadway, New York 19, Secretary.

NORTH AMERICAN CHAPTER, INTERNATIONAL SOCIETY OF ANGIOLOGY, Conrad Hilton Hotel, Chicago, June 7. Dr. Henry Haimovici, 105 East 90th St., New York 28, Secretary.

SOCIETY FOR INVESTIGATIVE DERMATOLOGY, Hotel Sherman, Chicago, June 7-8. Dr. Herman Beerman, 255 South 17th St., Philadelphia 3, Secretary.

SOCIETY FOR VASCULAR SURGERY, Chicago, June 8, Dr. George D. Lilly, 331 Ingraham Bldg., Miami 32, Fla., Secretary.

THE ENDOCRINE SOCIETY, Palmer House, Chicago, June 5-7. Dr. Henry H. Turner, 1200 North Walker St., Oklahoma City 3, Secretary.

UPPER PENINSULA MEDICAL SOCIETY, Country Club, Iron Mountain, Mich., June 27-28. Dr. E. Theodore Palm, 412 Superior Ave., Crystal Falls, Mich., Secretary.

WYOMING STATE MEDICAL SOCIETY, Nobel Hotel, Lander, June 5-7. Dr. Glenn W. Koford, 2020 Carey Ave., Cheyenne, Secretary.

INTERNATIONAL

AUSTRALASIAN MEDICAL CONGRESS, Melbourne Victoria, Australia, Aug. 22-30. Dr. C. H. Dickson, Medical Society Hall, 426 Albert St., East Melbourne, Victoria, Australia, General Secretary.

COMMONWEALTH AND EMPIRE HEALTH AND TUBERCULOSIS CONFERENCE, Central Hall, London, England, July 8-13. Dr. J. H. Harley Williams, Tavistock House North, Tavistock Sq., London, W.C.1, England, Secretary General.

CONGRESS OF THE INTERNATIONAL DIABETES FEDERATION, Leyden, Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, Netherlands, Secretary.

EUROPEAN CONGRESS OF CARDIOLOGY, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

EUROPEAN SOCIETY OF CARDIOVASCULAR SURGERY, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

INTERAMERICAN CARDIOLOGICAL CONGRESS, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

INTER-AMERICAN CONGRESS OF PUBLIC HEALTH, Havana, Cuba, Sept. 27-Oct. 1. Pan-American Sanitary Bureau, 2001 Connecticut Ave., Washington, D. C.

INTER-AMERICAN CONGRESS OF RADIOLOGY, Mexico City, Mexico, Nov. 2-8. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

INTERNATIONAL CONGRESS OF BIOCHEMISTRY, Paris, France, July 21-27. Prof. Jean Courtois, 4, Avenue de l'Observatoire, Paris 6e, France, Secretary.

INTERNATIONAL CONGRESS OF DERMATOLOGY AND SYPHILOLOGY, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

INTERNATIONAL CONGRESS OF DIETETICS, Royal Tropical Institute, Amsterdam, The Netherlands, July 7-11. Miss Diane J. Ten Haaf, Educational Bureau of the Nutritional Council, 42 Koninginnegracht, The Hague, Netherlands, General Secretary.

INTERNATIONAL CONGRESS ON DISEASES OF THE CHEST, Rio de Janeiro, Brazil, Aug. 24-30. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Illinois, Executive Secretary.

INTERNATIONAL CONGRESS OF HAEMATOLOGY, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

INTERNATIONAL CONGRESS OF HEALTH TECHNICIANS, Palais de la Mutualite, Paris, France, June 9-14. Secretariat General, 6 Square Desaix, Paris XVe, France.

INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE, Nice-Cannes, France, and Monaco, Sept. 8-18. Dr. F. A. Sondervorst, 124 Avenue des Allies, Louvain, Belgium, Secretary-General.

INTERNATIONAL CONGRESS ON HYDATID DISEASE, Santiago, Chile, Nov. 21-24. Organizing Committee, P. O. Box 9183, Santiago, Chile.

INTERNATIONAL CONGRESS OF INTERNAL MEDICINE, Friends House, London, N.W.1, Eng. Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

INTERNATIONAL CONGRESS ON MEDICAL RECORDS, London, England, Sept. 7-12. Miss Gwen Perkins, 120 C Street S.E., Washington, D. C., Chairman.

INTERNATIONAL CONGRESS OF MEDICINE AND SPORT, Paris, France. May 29-June 1. Prof. Chailley-Bert, 1 rue Lacretelle, Paris 15e, France, Chairman.

INTERNATIONAL CONGRESS ON NEUROPATHOLOGY, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

INTERNATIONAL CONGRESS OF PHYSICAL MEDICINE, London, England, July 14-19. Dr. A. C. Boyle, 45, Lincoln's Inn Fields, London, W.C.2, England, Hon. Secretary.

INTERNATIONAL CONGRESS OF PHYSIOPATHOLOGY OF ANIMAL REPRODUCTION AND ARTIFICIAL INSEMINATION, Copenhagen, Denmark, July 7-10. Prof. Ed. Sorensen, The Royal Veterinary and Agricultural College, Bülowsvej 13, Copenhagen V, Denmark.

INTERNATIONAL CONGRESS OF UROLOGY, The Waldorf-Astoria, New York, N. Y., U. S. A., Sept. 15-18. Dr. John A. Taylor, 2 East 54th St., New York, N. Y., U. S. A., Secretary-General.

INTERNATIONAL SOCIETY OF GEOGRAPHIC PATHOLOGY, Liège, Belgium, July 15-18. Dr. Fred C. Roulet, Habelstr. 24, Basel, Switzerland, Secretary General.

INTERNATIONAL UNION AGAINST TUBERCULOSIS, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secretary-General.

NEURORADIOLOGIC SYMPOSIUM, Stockholm, Sweden, Sept. 17-20. Docent Ake Lindbom, Symposium Neuroradiologicum, Serafimerlasarettet, Stockholm K., Sweden, Secretary.

WORLD MEDICAL ASSOCIATION, Athens, Greece, Oct. 12-16. Dr. Louis H. Bauer, 2 East 103d St., New York 29, N. Y., Secretary General.

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DEATHS

Pemberton, Frank Arthur ⊕ Boston; born in Auburndale, Mass., in 1884; Harvard Medical School, Boston, 1909; served as clinical professor of gynecology, Harvard Medical School, Courses for Graduates; assistant in gynecology at his alma mater from 1911 to 1925, instructor in gynecology from 1926 to 1932, and clinical professor of gynecology and head of the department of gynecology from 1933 to 1946; specialist certified by the American Board of Obstetrics and Gynecology; in 1935 president of the Obstetrical Society of Boston; member of the American Gynecological Society of which he was vice-president in 1939, New England Obstetrical and Gynecological Society serving as president in 1942-1943, New England Surgical Society, Boston Surgical Society, and the American Urological Association; fellow of the American College of Surgeons; for many years affiliated with Free Hospital for Women, New England Deaconess Hospital, and Palmer Memorial Hospital; died in Fort Lauderdale, Fla., March 6, aged 67, of coronary occlusion.

Pfunder, Malcolm Chester ⊕ Minneapolis; born in Two Creeks, Wis., Jan. 19, 1888; Rush Medical College, Chicago, 1920; certified by the National Board of Medical Examiners; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; past president of the Hennepin County Medical Society and the Minnesota Academy of Ophthalmology and Otolaryngology; served as a fellow in ophthalmology at the Mayo Foundation in Rochester, Minn.; formerly on the faculty of the University of Minnesota Medical School, where he had been clinical assistant professor of ophthalmology; affiliated with Swedish, Lutheran Deaconess, Minneapolis General, Fairview, and Mount Sinai hospitals; died Jan. 23, aged 64, of carcinoma of the stomach.

Shands, Harley R. ⊕ Jackson, Miss.; born in Senatobia, Miss., Feb. 27, 1881; Medical Department of Tulane University of Louisiana, New Orleans, 1905; member of the founders' group of the American Board of Surgery; member and in 1927 vice president of the Southern Surgical Association; life member, and from 1927 to 1933 member of the board of governors of the American College of Surgeons; past president of the Mississippi State Medical Association; consulting surgeon, Mississippi State Charity Hospital in Jackson and Mississippi State Tuberculosis Sanatorium in Sanatorium; visiting surgeon, Mississippi Baptist Hospital, where he was a member of the board of trustees and where he died March 17, aged 71, of acute pulmonary edema.

Riker, George Albert ⊕ Medical Inspector, Commander, U. S. Navy, retired; Newport, R. I.; born in Philadelphia Oct. 21, 1879; Jefferson Medical College of Philadelphia, 1905; commissioned in the medical corps of the Navy June 11, 1909; served aboard the USS South Dakota, USS Franklin, USS Louisiana, and various ships in Asiatic waters; his shore duty included service at Receiving Station, Washington, D. C., Navy Yard, Washington, D. C., Naval Hospital, Great Lakes, Ill., and Naval Training Station, Newport, R. I.; placed on the retired list with the rank of commander, by reason of physical disability, on Nov. 1, 1936; died in the U. S. Naval Hospital Feb. 1, aged 72, of burns.

Perdue, J. Randolph ⊕ Miami, Fla.; born in Rocky Mount, Va., July 29, 1908; University of Virginia Department of Medicine, Charlottesville, 1932; specialist certified by the American Board of Obstetrics and Gynecology; member of the Southeastern Surgical Congress, Southern Medical Association, and the South Atlantic Association of Obstetricians and Gynecologists, of which he had been president; fellow of the American College of Surgeons; formerly vice-president of the Florida East Coast Medical Association; affiliated with the Jackson Memorial Hospital; on the staffs of Mount Sinai Hospital and St. Francis Hospital in Miami Beach, where he died March 27, aged 43.

⊕ Indicates Fellow of the American Medical Association.

Newell, Edward Dunbar ⊕ Chattanooga, Tenn.; Medical Department of Tulane University of Louisiana, New Orleans, 1897; past president of the Southern Railway Surgeons Association and Chattanooga-Hamilton County Medical Society; member of the House of Delegates of the American Medical Association in 1906; member of the Southern Surgical Association; fellow of the American College of Surgeons; member of the founders' group of the American Board of Surgery; served during World War I; co-founder of the Newell and Newell Sanitarium, now known as the Newell Hospital, where he died Feb. 13, aged 79, of a heart attack.

Hageman, George Ricker ⊕ Longmont, Colo.; born in Washington, Kan., Jan. 14, 1891; University of Michigan Medical School, Ann Arbor, 1919; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; served during World War I; formerly practiced in Brooklyn, where he was on the staff of the Long Island College Hospital; on the staff of the Longmont Hospital; died in the Presbyterian Hospital, Denver, March 3, aged 61, of coronary thrombosis.

Palmer, Don Henry ⊕ Seattle; Rush Medical College, Chicago, 1903; member of the House of Delegates of the American Medical Association in 1916 and 1922, and an Associate Fellow; specialist certified by the American Board of Plastic Surgery; served as surgeon to federal prisoners; fellow of the American College of Surgeons; affiliated with Swedish, Providence, Doctors, Maynard, and Seattle General hospitals in Seattle and Renton (Wash.) Hospital; for many years physician for the University of Washington athletic teams; died in Seattle General Hospital March 18, aged 74.

Haigh, John Ellingworth, Dayton, Ohio; University of Toronto Faculty of Medicine, Toronto, Canada, 1909; died Dec. 25, aged 70.

Halley, William B., Ballinger, Texas; University of Texas School of Medicine, Galveston, 1897; died Dec. 6, aged 82, of coronary accident and arteriosclerosis.

Hoch, Charles Martin Jr., Smithville, Texas; University of Texas School of Medicine, Galveston, 1935; member of the American Medical Association; served as secretary of the Bastrop County Medical Society; member of the American Academy of General Practice; died recently, aged 39.

Hubbs, Elwood Samuel, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1898; died Feb. 17, aged 75, of carcinoma of the throat.

Hunter, Ira Ellis, Toledo, Ohio; Miami Medical College, Cincinnati, 1900; died Jan. 5, aged 82.

King, Charlton Roper, Arlington, Va.; George Washington University School of Medicine, Washington, D. C., 1920; formerly connected with the U. S. Public Health Service; died in St. Petersburg, Fla., Jan. 17, aged 55.

Leach, James Edward, Gadsden, Ala.; University of Nashville Medical Department, 1900; member of the American Medical Association; died Jan. 23, aged 74, of hypertensive cardiovascular disease.

Long, Charles-Francis ⊕ Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1923; acting associate professor of industrial medicine at Woman's Medical College of Pennsylvania; chairman of the commission on industrial health and hygiene of the Medical Society of the State of Pennsylvania; member of the Industrial Medical Association; fellow of the College of Physicians of Philadelphia; on the staff of the Episcopal Hospital; medical director, Bayuk Cigars, Inc.; died Feb. 28, aged 53, of pulmonary edema and myocardial failure.

Loving, Maribel ⊕ Austin, Texas; University of Texas School of Medicine, Galveston, 1935; died recently, aged 44, of coronary occlusion.

Lyncker, Nicolas, Jacksonville, Fla.; National Medical University, Chicago, 1909; died Jan. 26, aged 76, of cerebral vascular accident and arteriosclerosis.

McCain, William Jasper, Livingston, Ala.; Medical College of Alabama, Mobile, 1891; member of the American Medical Association; died Jan. 21, aged 86, of coronary occlusion.

McCandless, Everette LeRoy, West Sunbury, Pa.; Maryland Medical College, Baltimore, 1910; died recently, aged 68, of myocardial degeneration and arteriosclerosis.

McCurley, Beman Guy, Cortland, Ohio; the Hahnemann Medical College and Hospital, Chicago, 1899; served as president of the county board of health; affiliated with Trumbull Memorial Hospital in Warren; a director of the Cortland Savings and Banking Company; died Dec. 18, aged 75, of arteriosclerosis.

McDuffie, Harold Fritz, Jacksonville, Fla.; New York Homeopathic Medical College and Flower Hospital, New York, 1913; past president of the Georgia State Board of Medical Examiners; formerly practiced in Atlanta, where he was on the staff of Georgia Baptist Hospital; died in Daytona Beach March 4, aged 61, of bronchopneumonia and coronary artery disease.

McEachin, Ivan Benton, Newport News, Va.; Howard University College of Medicine, Washington, D. C., 1925; died Nov. 5, aged 54, of malignant hypertension.

Madera, William Luther ✙ Morgantown, W. Va.; Medical College of Virginia, Richmond, 1927; served during World War I; died in Washington, D. C., Feb. 11, aged 55, of coronary disease.

Mangano, James Lorito ✙ Rochester, N. Y.; University of Buffalo School of Medicine, 1914; member of the American College of Chest Physicians; served during World War I; for many years associated with Park Avenue Hospital; physician at Monroe County Penitentiary; died in Strong Memorial Hospital Feb. 2, aged 64, of diabetes mellitus.

Marple, Festus Oval ✙ Huntington, W. Va.; Eclectic Medical College, Cincinnati, 1911; past president of the Cabell County Medical Society; served during World War I; on the staffs of the Chesapeake and Ohio, Huntington Memorial, St. Mary's and Guthrie hospitals; died in Holston Valley Community Hospital in Kingsport, Tenn., Feb. 13, aged 66, of ruptured aneurysm of the abdominal aorta.

Marshall, Charles Jay ✙ Binghamton, N. Y.; Syracuse University College of Medicine, 1924; specialist certified by the American Board of Obstetrics and Gynecology; consulting obstetrician, Ideal Hospital in Endicott and Charles S. Wilson Memorial Hospital in Johnson City; consulting gynecologist, Broome County Tuberculosis Hospital in Chenango Bridge; chief of obstetrics at Our Lady of Lourdes Memorial Hospital; died Dec. 15, aged 51, of coronary occlusion.

Mitchell, Ezra Jay, Brodhead, Wis.; Northwestern University Medical School, Chicago, 1903; served during World War I; died in Sarasota, Fla., Jan. 26, aged 79.

Monahan, John Ambrose ✙ Clinton, Mass.; Tufts College Medical School, Boston, 1903; member of the American Academy of Ophthalmology and Otolaryngology; served as a member of the board of health; associated with Clinton Hospital of which he had been a trustee; affiliated with Massachusetts Eye and Ear Infirmary in Boston, Memorial Hospital in Ayer, Leominster (Mass.) Hospital and Marlborough Hospital in Marlboro; died Feb. 21, aged 73, of hypertensive heart disease.

Moore, Arthur Selwyn, Sarasota, Fla.; University of Michigan Homeopathic Medical School, Ann Arbor, 1901; fellow of the American Psychiatric Association and the American College of Hospital Administrators; served as consultant of the Associated Hospital Service of New York; served during World War I; for many years affiliated with the Middletown (N. Y.) State Homeopathic Hospital; first medical superintendent of the Elizabeth A. Horton Memorial Hospital in Middletown, N. Y.; died Feb. 9, aged 72, of chronic bronchitis and coronary insufficiency.

Moore, Burt A., Louisville, Ky.; University of Louisville Medical Department, 1907; died in Baptist Hospital Jan. 29, aged 67, of cerebrovascular accident and hypertension.

Morton, Goodridge Venable, Fort Worth, Texas; Fort Worth School of Medicine, Medical Department of Fort Worth University, 1897; member of the American Medical Association; on the staffs of St. Joseph's, All Saints, and W. I. Cook Memorial hospitals; died in Harris Hospital Feb. 28, aged 78, of esophageal diverticulum.

Mowry, Charles, Convoy, Ohio; University of Wooster Medical Department, Cleveland, 1903; member of the American Medical Association; on the staff of Van Wert County Hospital in Van Wert, where he died Jan. 25, aged 76.

Nawrocki, Joseph F. J., St. Louis; St. Louis University School of Medicine, 1906; member of the American Medical Association; on the courtesy staff, department of general practice, De Paul Hospital, where he died Feb. 12, aged 69, of carcinoma of the urinary bladder.

Nichols, Clay Sr., ✙ Luling, Texas; Medical Department of Tulane University of Louisiana, New Orleans, 1890; past president of the Caldwell County Medical Society; past president of the school board; died Feb. 29, aged 84, of coronary thrombosis.

Nichols, Thomas Lomax, Louisville, Ky.; Meharry Medical College, Nashville, Tenn., 1918; served as a member of the Louisville and Jefferson County Health Board; died Jan. 16, aged 61.

Olson, Olof Alfred, Rockford, Ill.; Hering Medical College, Chicago, 1908; member of the American Medical Association; formerly on the staff of St. Anthony's Hospital; died Feb. 27, aged 81, of coronary occlusion.

Ormsby, Floyd Edwin, Dallas, Texas; Southwestern University Medical College, Dallas, 1911; member of the American Medical Association; died in Methodist Hospital Feb. 24, aged 67.

Owens, William Irvine ✙ Pulaski, Va.; Medical College of Virginia, Richmond, 1923; died in Lewis Gale Hospital, Roanoke, Feb. 23, aged 55, of cardiovascular renal disease.

Pack, Seba Egbert, Louisville, Ky.; University of West Tennessee College of Medicine and Surgery, Memphis, 1915; served in France during World War I; died Feb. 2, aged 65.

Perkins, Carter Constantine ✙ Altadena, Calif.; St. Louis University School of Medicine, 1907; an Associate Fellow of the American Medical Association; member of the Colorado State Medical Society; formerly practiced in Denver, where he was associated with the health department, served as chief surgeon for the Denver division of the Burlington Railroad, and on the staffs of Children's and St. Luke's hospitals; died Feb. 6, aged 78, of coronary sclerosis.

Plunkett, John Horace, Wagoner, Okla.; Vanderbilt University School of Medicine, Nashville, Tenn., 1912; member of the American Medical Association; died Feb. 4, aged 77, of a heart attack.

Putts, Benjamin Swayne, Fort Lauderdale, Fla.; Johns Hopkins University School of Medicine, Baltimore, 1906; specialist certified by the American Board of Radiology; member of the American Roentgen Ray Society, Radiological Society of North America, and the American College of Radiology; formerly practiced in Erie, Pa., where he was on the staffs of the Hamot and St. Vincent's hospitals; died in Broward General Hospital Jan. 31, aged 69, of uremia.

Quick, James B., Laurium, Mich.; Northwestern University Medical School, Chicago, 1901; member of the American Medical Association; on the staff of the Calumet Public Hospital; died in Newberry Jan. 25, aged 90, of arteriosclerosis.

Quigley, John Scott, Oakland, Calif.; Stanford University School of Medicine, San Francisco, 1933; for many years medical consultant for the Alameda High School football team; served during World War II; died Feb. 25, aged 48.

Ransom, Edward Madison ✙ Minot, N. D.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1904; member of the Central Association of Obstetricians and Gynecologists; specialist certified by the American Board of Obstetrics and Gynecology; on the staff of Trinity Hospital, where he died Nov. 17, aged 69, of cerebral hemorrhage.

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Reilly, Thomas Edward, Marlboro, Mass.; Dartmouth Medical School, Hanover, N. H., 1910; on the staff of the Marlboro Hospital; died Feb. 27, aged 67, of cerebral thrombosis and heart disease.

Reitz, George Ballantyne ✙ Brooklyn; Long Island College Hospital, Brooklyn, 1913; member of the Industrial Medical Association; fellow of the American College of Surgeons; served during World War I; on the staff of St. John's Episcopal Hospital; on the courtesy staff of the Peck Memorial Hospital; died Feb. 23, aged 61, of hypertensive heart disease.

Risdon, James Waldo ✙ Leavenworth, Kan.; University Medical College of Kansas City, Mo., 1905; on the staffs of St. John's and Cushing Memorial hospitals; died Jan. 30, aged 74, of coronary occlusion.

Riser, Roy Otis ✙ Park Ridge, Ill.; University of Illinois College of Medicine, Chicago, 1931; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology; clinical associate professor of ophthalmology at his alma mater; served as vice president of the Chicago Ophthalmological Society; consultant in ophthalmology at St. Francis Hospital in Evanston, Ill.; affiliated with Children's Memorial and Research and Educational hospitals in Chicago; died Jan. 3, aged 45.

Robb, Claude Albert, Butler, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1910; fellow of the International College of Surgeons; on the staff of the Butler County Memorial Hospital; died Feb. 25, aged 66, of cerebral hemorrhage.

Robinson, Edith A. Carson ✙ Pittsburgh; University of Pittsburgh School of Medicine, 1911; associated with the medical department of the board of public education; died Feb. 19, aged 66, of coronary occlusion.

Roop, Ernest P., New Market, Md.; Baltimore Medical College, 1903; member of the American Medical Association; formerly mayor of New Market; affiliated with Frederick (Md.) Memorial Hospital; died Feb. 3, aged 75, of injuries received in an automobile accident.

Royals, Thomas Edward ✙ Meridian, Miss.; Tulane University of Louisiana, New Orleans, 1907; served during World War I; on the staff of St. Joseph Hospital where he died Feb. 19, aged 73, of carcinoma of the stomach.

Rozan, Milton Michael ✙ Lansing, Mich.; University of Michigan Medical School, Ann Arbor, 1929; specialist certified by the American Board of Obstetrics and Gynecology; fellow of the American College of Surgeons; served during World War II; on the staffs of the St. Lawrence and Edward W. Sparrow hospitals; died Feb. 25, aged 49, of heart failure.

Sammons, George Whittenhal Hess, Farmington, N. M.; Rush Medical College, Chicago, 1904; died in Albuquerque, Feb. 5, aged 77.

Shumate, Thomas Edward, San Francisco; Cooper Medical College, San Francisco, 1894; also a druggist; member of the American Medical Association; served as police commissioner; for many years member of the board of trustees of St. Francis Hospital, where he died Feb. 27, aged 80, of coronary occlusion and diabetes mellitus.

Singer, Charles I. ✙ New York; Deutsche Universität Medizinische Fakultät, Prague, 1921; died Dec. 10, aged 55.

Singer, Joseph Isaac ✙ New York; New York University and Bellevue Hospital Medical College, New York, 1908; died in Palm Beach, Fla., Jan. 22, aged 69, of injuries received in an automobile accident.

Sloan, Clarence Reuben, Marietta, Ohio; Eclectic Medical Institute, Cincinnati, 1901; vice-president of the Washington County Medical Society, 1927, 1938, and 1940; died Jan. 15, aged 73.

Smith, Malcolm Kinmonth, Newport, R. I.; Cornell University Medical College, New York, 1910; retired assistant medical director of the Prudential Life Insurance Company; served during World War I; died Feb. 14, aged 72, of coronary thrombosis.

Steadman, Leonard Somerville, Junction City, Kan.; University Medical College of Kansas City, Mo., 1896; member of the American Medical Association; served as health officer of Geary County; died recently, aged 80, of coronary occlusion.

Van Ness, J. Howard, Allegan, Mich.; Dearborn Medical College, Chicago, 1905; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1906; member of the American Medical Association; died in Miami, Fla., recently, aged 79, of acute coronary thrombosis.

Vines, J. B., Bessemer, Ala. (licensed in Alabama, year unknown); died Jan. 25, aged 79, of arteriosclerosis.

Ware, Sara Jane Williams, New Rochelle, N. Y.; Woman's Medical College of Pennsylvania, Philadelphia, 1890; died in New Rochelle Hospital Feb. 10, aged 91, of coronary occlusion and coronary arteriosclerosis.

Wilson, James Iradel, Ochlochnee, Ga.; University of Georgia Medical Department, Augusta, 1891; died Jan. 29, aged 87, of uremia.

Wood, Nathaniel Knight ✙ Cambridge, Mass.; Harvard Medical School, Boston, 1901; member of the American Clinical and Climatological Association; on the board of directors for many years and president at time of his death of the Boston Tuberculosis Association; served on the staffs of Boston City, Boston Lying-In, Carney, Boston Consumptive and Peter Brigham hospitals and Boston Dispensary, all in Boston, died Jan. 3, aged 75, of coronary thrombosis.

DIED WHILE IN MILITARY SERVICE

Hines, Clifford Gentner ✙ Captain, U. S. Navy, Washington, D. C.; born in Washington, D. C., June 3, 1894; George Washington University School of Medicine, Washington, 1917; on completion of his internship at Emergency Hospital, Washington, D. C., was commissioned a lieutenant (jg) in the Naval Reserve, and transferred to the regular Navy in 1921; advanced to the rank of captain on June 16, 1942; served in the Washington, D. C., area at the Naval Medical School, Naval Dispensary, and, following cruises on the USS Alabama, at the Naval Hospital until the spring of 1923; served for two years at the Naval Station, St. Thomas, Virgin Islands; in 1925 returned to the Naval Hospital, Washington, D. C., for duty and a postgraduate course in psychiatry at St. Elizabeth's Hospital; following service in the Philippine Islands and with the Asiatic Fleet, was transferred to the USS Guam, where he served as senior medical officer; served at Pearl Harbor, Hawaii, then became chief of psychiatric service of the Naval Hospital, Mare Island, Calif.; later served in the same capacity in the Naval Hospital, Philadelphia, and at the Naval Prison, Portsmouth, N. H., until 1946; then was attached to the executive office, Secretary of the Navy; served as commanding officer, Naval Hospital, Coco Solo, Canal Zone, and on return to the United States assumed similar duties at the Naval Hospital, Annapolis, Md.; a member of the Medical Society of George Washington University, Association of Military Surgeons of the United States, Maryland Mental Hygiene Society, Maryland Society for Medical Research, Panama Canal Natural History Society, and American Association for the Advancement of Science; on the staff of St. Elizabeth's Hospital; was awarded the Yangtze Service Medal, the American Defense Service Medal with star, and the World War II Victory Medal; died at his home in Arlington, Va., March 2, aged 57, of coronary insufficiency.

Wesolowski, Louis Anthony, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1947; member of the American Medical Association; lieutenant in the Medical Corps of the U. S. Naval Reserve; died in the Naval Hospital, San Diego, Feb. 16, aged 29, of coronary thrombosis.

GOVERNMENT SERVICES

ARMY

ROTC Students in Summer Training at Army Hospitals.—More than 1,500 members of the Reserve Officers' Training Corps at medical, dental, veterinary, and pharmacy schools throughout the country will participate in professional and field training this summer at nine Army medical installations, the Army has announced. Except for last year's class, the group is the largest to take summer training since the establishment of the Army Medical Service ROTC program.

Six weeks' training in field medicine and clinical practice, beginning June 14 and July 26, will be given at the following Army hospitals to medical and dental ROTC students who have served a year's active duty in the armed forces: Brooke, Fort Sam Houston, Texas; Walter Reed, Washington, D. C.; Fitzsimons, Denver; Letterman, San Francisco; Percy Jones, Battle Creek, Mich.; and Valley Forge, Phoenixville, Pa. In addition, Fitizsimons has scheduled a special six week camp beginning May 12 for 22 medical students unable to attend either of the regular classes. Madigan Army Hospital, Tacoma, Wash., will train only one class beginning July 26.

ROTC enrollees without previous military service will receive instruction, also beginning June 14 and July 26, at U. S. Army hospitals at Fort Benning, Ga., and Fort Bragg, N. C. They will divide their time equally between field training and clinical clerkship work in the hospital, whereas students with prior service spend only two weeks in the field and four weeks in professional activities.

Forty-eight medical schools and 18 dental schools in the United States will send ROTC units to this summer's encampments. The 150 veterinary students, drawn from six institutions, and 100 pharmacy students, from four schools of pharmacy, will begin their six week training at Brooke Army Medical Center on June 21. ROTC members taking part in the exercises include third year students and some seniors scheduled to be graduated during the early part of next year.

Medical ROTC members are granted Reserve commissions as first lieutenants in the Medical Corps on graduation but are assured of at least one year's civilian internship before being called to active duty unless selected for a military internship. Similarly, dental and veterinary graduates who take commissions will not be immediately ordered to active duty unless their status under Public Law 779 makes them liable for such a call.

NAVY

Training Courses for Reserve Officers.—Volunteer Naval Reserve Medical Department officers may attend, on active duty orders, the following training courses during the fiscal year that begins July 1. Acceptance of orders to attend these courses of instruction will not in any way increase the possibility of their being involuntarily recalled to active service.

A one-week course, convening on Aug. 4, 1952; Nov. 17, 1952; and March 16, 1953, at the Naval Medical School, Bethesda, Md. Volunteer Naval Reserve Medical Department officers who reside in the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts and the Potomac River Naval Command may apply to the commandant of their respective district for orders to attend. The course will present problems likely to be confronted and techniques to be employed by medical department officers in the field of radiological activity that are not available to them in their civilian capacity. A similar course will be convened at the Naval Station, Treasure Island, San Francisco, on March 2, 1953, for volunteer Naval Reserve Medical Department officers who reside in the 11th, 12th, and 13th Naval Districts. Interested officers may apply to their respective Commandants for orders to attend the course to be given at San Francisco.

Amphibious Medicine: A course convening on July 7, 1952; Oct. 6, 1952; and April 6, 1953, at the Naval Amphibious Base, Little Creek, Va. All volunteer naval reserve medical department officers, except nurse corps officers, are eligible. Those residing in the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts and the Potomac River Naval Command may request orders to attend these courses from the commandant of their respective district. The course will consist of lectures, training films, demonstrations, and practical exercises to familiarize Medical Department officers with the nature of the medical service provided in amphibious operations.

Malariology and Insect Control: Courses will convene on the first and third Wednesday of each month during the fiscal year 1953 at the Naval Air Station, Jacksonville, Fla. The course provides information and techniques to be employed in insect control and practical field experience.

Probationary (Medical) Training: This two-week training course will be conducted during the months of July, August, and September, 1952, in the professional services at various naval hospitals. Only ensigns probationary (medical) are eligible for this training. Applications should be submitted to respective commandants.

Research for Ensign Probationary (Medical): This is a new training course to acquaint the trainee with naval medical research as a whole, and a review in detail of the research program of the institution at which the trainee is on training duty. The trainee will spend a part of each day in each of the research departments, following which he will serve as an assistant in actual laboratory research work on one specific project underway at the time. Ensigns probationary (medical) who have successfully completed first year of medical school and have manifested an interest in medical research are eligible for this training.

AIR FORCE

Flying Doctors.—A group of young medical officers from the School of Aviation Medicine have reported to Goodfellow Air Force Base in San Angelo, Texas, for eight weeks of flight instruction as part of their basic course in airmedicine.

The 20 officers will fly and study along with air cadets. They will get 45 hours of dual instruction in single-engine T-6 trainers and two hours in twin-engine TB-25s. In addition, they will spend 10 hours under the hood of a Link trainer, learning to fly by instruments, and 132 hours in class rooms, studying navigation, engine design, electronics, and other nonanatomical subjects.

The basic course in aviation medicine, for which these twenty men were carefully selected, is limited to regular Air Force medical officers and to reserves who volunteer for five years of active duty. It is designed to qualify them as specialists in the aeromedical field. They receive a year of study at the School of Aviation Medicine's Randolph Field headquarters, climaxed by this eight-week taste of pilot training. Then they take another year of postgraduate work at a civilian medical college.

Johns Hopkins University in Baltimore is the first nonmilitary school to give this specialized aeromedical instruction. After these two years of formal teaching, in the course of which they are awarded flight surgeons' wings, the doctors spend three more years with Air Force units in the field. With this experience, they are eligible for certification in the specialty of aviation medicine.

Specialty Consultants Named.—Seven Air Force medical officers have been named specialty consultants for the Air Force Medical Service, it was disclosed April 25 by Brig. Gen. Earl Maxwell (MC) USAF, director of professional services for the Air Force Surgeon General. General Maxwell himself has been des-

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ignated as consultant in ophthalmology. The other officers are: Col. William D. Preston, consultant in internal medicine; Col. Oscar S. Reeder, consultant in orthopedic surgery; Col. John A. Schindler, consultant in urology; Col. Ralph M. Thompson, consultant in pathology; Lt. Col. Carlos C. Alden Jr., and Capt. Edward J. Kollar Jr., consultants in neuropsychiatry. Colonel Schindler is chief of the physical standards division, directorate of professional services. Colonel Thompson is deputy director of the Armed Forces Institute of Pathology. Colonel Reeder heads the new group that replaces the former medical consultants division in the directorate of professional services. Colonel Preston, Colonel Alden, and Captain Kollar are assigned to the consultants group as primary duty.

Helicopter Men Win Trophy.—The Third Air Rescue outfit has made many life-saving missions into the forward area in Korea since the beginning of the conflict. In a matter of minutes, a downed pilot in Korea is admitted to the patient compartment of a helicopter, which then rises over the front lines. The pilot guides the helicopter between mountains while an aeromedical specialist administers treatment to the injured person. The ambucopter settles on the heliport of the Air Force's 67th Medical Group and the staff of the USAF Hospital, having been previously alerted, has medical facilities ready for treatment of the incoming patient. The complete frontline evacuation operation has not taken more than 40 minutes.

The rotary-wing aircraft received fitting tribute recently when the Collier Trophy aeronautical award was presented to "the men who make this wonderful machine and to those who have used it to save so many lives."

Ambucopter Brings in Casualties

Personal.—Col. Fratis L. Duff, (MC) USAF, addressed the graduating class at the Harvard Post Graduate School of Public Health on April 18. His talk concerned respiratory diseases of the Air Force, streptococcal disease, and rheumatic fever. The military preventive medicine course, before which he spoke, is primarily for students from the military services and those in the reserve corps or with other responsibilities of civil and military defense nature. Colonel Duff is chief of the preventive medicine division in the Office of USAF Surgeon General. He delivered the address at the invitation of Dr. James Stevens Simmons, brigadier general, USA (ret.), dean of the Harvard School of Public Health.

ATOMIC ENERGY COMMISSION

Industrial Hygiene Training Program.—The Atomic Energy Commission has inaugurated a one year fellowship training program for industrial hygienists, starting in the fall of 1952. If qualified candidates can be obtained, up to four will be selected for one school year of academic training. The stipend for the industrial hygiene fellows would be: $1,500 per annum if single; an additional $500 if married and $250 additional for each of two dependent children. If the fellow has completed one or more years of graduate work in a related field, he will be allowed $200 additional. Candidates will be selected by a committee headed by H. F. Schulte, group leader, industrial hygiene group, Los Alamos Scientific Laboratory, Los Alamos, N. M. All candidates would be required to have a security investigation before being appointed. The program will be administered by the Atomic Energy Project, School of Medicine and Dentistry, University of Rochester, Rochester, N. Y. Applicants must have a degree in engineering (preferably chemical), chemistry, or physics. Application blanks may be obtained from Mr. Merril Eisenbud, New York Operations Office, Atomic Energy Commission, P. O. Box 30, Ansonia Station, New York 23, N. Y.

Dr. Bugher Succeeds Dr. Warren.—The resignation of Dr. Shields Warren as director of the Atomic Energy Commission's division of biology and medicine is effective June 30. The appointment of Dr. John C. Bugher as his successor has been announced. Dr. Bugher, deputy director of the biology and medicine division, has been a member of the International Health Division of the Rockefeller Foundation since 1938. He has engaged in research and control of infectious diseases, including work on yellow fever in South America and Africa and the control of other tropical diseases. Born in Indiana in 1901, Dr. Bugher was graduated from the University of Michigan. He was assistant in bacteriology at Michigan, instructor and assistant professor of bacteriology at the medical school, and public health director for South Haven, Mich., from 1926 to 1928. He is a member of the Society of Experimental Pathology, Association of Pathology and Bacteriology, Association of Cancer Research, Society of Clinical Pathology, American Medical Association, and the American Society of Tropical Medicine and the Royal Society of Tropical Medicine.

MISCELLANEOUS

624 Graduate Fellowships Awarded.—The National Science Foundation, 2144 California St., N. W., Washington 25, D. C., has awarded 624 graduate fellowships in the natural sciences for the academic year 1952-53. The successful fellows were selected from about 3,000 applications from all parts of the United States and its possessions and from American citizens abroad. The list of awards includes 569 predoctoral fellows and 55 postdoctoral fellows. All fellows were selected by the foundation on the basis of ability, with awards made in cases of substantially equal ability so as to result in a wide geographical distribution.

A total of 169 (27%) of the awards were made to first year graduate students. This is a sharp departure from previous federal fellowship programs in which the major emphasis has been on awards to advanced students. The foundation hopes through this policy to encourage college graduates having scientific aptitude to continue with advanced studies in preparation for careers in scientific research and teaching. A total of 170 of the awards were made to second year graduate students, 230 to advanced predoctoral students, and 55 to postdoctoral fellows. The largest group of fellowships, 158, were awarded in the biological sciences. In other fields the number of awards were: chemistry, 140; physics, 137; engineering, 75; mathematics, 62; earth sciences, 36; agriculture, 7; astronomy, 6; and anthropology, 3.

Fellows may pursue their training at accredited non-profit institutions of higher education in the United States or similar institutions abroad approved by the foundation. Before he may begin his fellowship the fellow must show that he will be accepted by the institution in which he plans to study. Stipends vary with the academic status of the fellows. First year fellows will receive a basic stipend of $1,400; second year, $1,600; advanced predoctoral, $1,700; and postdoctoral, $3,000 per year. Second year, advanced predoctoral and postdoctoral fellows will receive additional allowances for wives and children. Normal tuition and laboratory fees will be paid by the foundation, and limited allowances to aid in defraying costs of travel will be provided.

National Science Foundation fellows will be expected to devote full time to advanced scientific study for the full tenure of the fellowship. The results of research carried out by a fellow during his training may be made available to the public without restriction, except as is required in the interest of national security. It is expected that the announcement concerning National Science Foundation Graduate Fellowships for 1953-54 will be made about Oct. 1, 1952. Application forms will not be available until that time.

FOREIGN LETTERS

AUSTRALIA

"Free" Medicine Costs Soar.—Since September, 1950, the commonwealth government has allocated a pharmaceutical benefit to every person in Australia. The list of drugs available is restricted to drugs that are designated as "life-saving"; the full details were given in the letter from Australia dated Sept. 20, 1950. This part of the scheme was estimated to cost £3,000,000 ($6,500,000). In the first year of operation, there was an expenditure of £5,000,000 ($11,000,000), and, at the present rate of expenditure, it is estimated that this year the cost will be £7,000,000 ($15,000,000). This is almost £1, or more than $2, per person in Australia.

The Minister of Health, Sir Earle Page, F.R.C.S., is naturally disturbed at this increase, and he ascribes part of the rise to the prescribing of the more costly drugs for conditions that are clinically unlikely to show improvement by their use. Consequently, a directive has been issued limiting the use of the more expensive drugs to specified conditions. Aureomycin is to be used only for acute and subacute bacterial endocarditis, Streptococcus faecalis pneumonia that has not responded to penicillin or sulfonamide therapy, and urinary tract infections caused by gram-negative organisms. Chloramphenicol is now limited to treatment of patients with typhoid fever, brucellosis, typhus and other rickettsial diseases, influenzal meningitis, granuloma inguinale, lymphogranuloma venereum, diseases caused by Hemophilus pertussis or H. influenza, acute laryngotracheal bronchitis, salmonellosis, and severe gastroenteritis in children. Dihydrostreptomycin can only be used in cases of H. influenza, chancroid, Friedländer's bacillus pneumonia, acute tuberculosis, salmonellosis, bacillary dysentery, tularemia, and surgical conditions of the bowel. Streptomycin is restricted to use for H. influenza, chancroid, Friedländer's bacillus pneumonia, acute tuberculosis, salmonellosis, bacillary dysentery, tularemia, and surgical conditions of the bowel. Diethylstilbestrol (stilbestrol) is to be used only for carcinoma of the prostate and testosterone propionate only for mammary carcinoma. Phenindamine tartrate is restricted to use for Parkinson's disease, and the quinine salts are restricted to use in malaria. Every prescription for these drugs must be endorsed in accordance with regulation 14A. For some time, there have been limitations on the quantity of any one drug prescribed during one day. Protein hydrolysates, for example, are limited to 1 liter per day. As most patients require continuous intravenous protein therapy for over a period of several days and the usual rate of infusion is 2 to 2½ liters per day, the patient must pay for the quantity in excess of 1 liter each day.

Medical Service for Pensioners.—For the last 12 months, all persons in Australia who receive an old age or invalid pension are entitled to "free" medical attention in their homes or at a physician's office. They have a choice of physicians. The patient signs a form on the strength of which the physician can collect 75% of the normal fee. The pensioner is also entitled to a wide range of pharmaceutical benefits, covering almost all his needs. These benefits also apply to the pensioner's dependents.

This service has considerably reduced the attendance of pensioners as outpatients at public hospitals and has reduced by 6% the number of persons applying to be inpatients. About 570,000 pensioners in Australia (6% of the population) and their dependents are eligible for this service.

Prepayment Medical Plan.—The commonwealth government subsidizes approved organizations that provide prepayment insurance policies. As a result, many persons are contributing, the total number at present exceeding 1,000,000, who, with their dependents, represent more than 30% of the total population of Australia. The patient, under this plan, has a choice of physicians and private hospitals.

The items in these letters are contributed by regular correspondents in the various foreign countries.

BRAZIL

Campaign Against Filariasis.—Drs. René Rachou and Leonidas M. Deane, of the malaria division of the National Health Department, reported to the Brazilian Society of Hygiene the first steps taken in the city of Belem, Pará, to fight the infection caused by Wuchereria bancrofti, the commonest filaria in Brazil. This work was done to comply with the directive given by the minister of health in August of last year stating that the division would undertake the study of the incidence of filariasis in Brazil and promote adequate preventive measures where the infection is known to exist or will be discovered. The malaria division, for a few years, has been spraying millions of houses with DDT against anophelines and so is well equipped to take up a similar task against other arthropods, as it is already doing to fight the reduviid bugs, which are vectors of American trypanosomiasis (Chagas' disease).

Of the eight known species of human filariasis, three have already been recognized in the equatorial and tropical sections of Brazil, namely, Dracunculus medinensis, D. bancrofti, and Mansonella ozzardi. The first one, imported from Africa through Negro slaves during the 17th and 18th centuries, found susceptible intermediate hosts in Bahia, where a few small foci were formed. Those small foci disappeared spontaneously, without any special measures, owing, it seems, to prolonged droughts, which extinguished the water collections. For many years, W. bancrofti has been identified in many localities of the tropical sections of the country. M. ozzardi, recognized for the first time in Manaus, Amazonas, by Dr. Maria Deane in 1949, was later found in several localities on the upper Amazon River. Little is known about the pathogenicity of the latter species, but W. bancrofti is a species of proved pathogenic action. The infection by W. bancrofti, well recognized as existent in several states of Brazil, is known only in connection with its clinical and therapeutic aspects. Our knowledge about the public health significance of bancroftiasis is scant.

Previous knowledge of bancroftiasis indicated Belem (population 250,000), at the mouth of the Amazon River, as a locality where the disease is important and Manaus (population 120,000), on the upper Amazon River, as a city with a low incidence. In some sections of the city of Salvador (population 380,000), on the eastern seaboard of Bahia, the incidence of bancroftiasis is relatively important. These data were derived, for Belem, in a survey by Drs. Causey, L. Deane, Costa, and M. Deane, in 1945, in which 5,000 persons were examined, with the disclosure of indexes of microfilaremia, filariasis, and elephantiasis of 10.8%, 12.0%, and 1.3 %, respectively. The principal vector was found to be Culex fatigans (11% of natural infestation), Anopheles tarsimaculatus (0.6%) and Anopheles darlingi (0.5%) being secondary vectors. In Manaus in 1948, Maria Deane examined 2,405 persons, 0.2% and 0.6% of whom were found to present W. bancrofti and M. ozzardi, respectively, in the blood. For better knowledge of the distribution of filariasis in Brazil, the malaria division has planned surveys in hundreds of localities of several states and territories. They plan to begin with the extreme northern sections of the country, near the borders of Peru, Colombia, Venezuela, and the Guianas. A special, intensive course was given during January, 1952, at Belem, to 15 entomologic technicians of the division.

At the same time, the malaria division prepared the plan of the first campaign, which has already begun in Belem, where it is conservatively estimated that 30,000 residents are infected by filariae. As the main course of action of the campaign, the spraying with residual insecticides is being performed in 43,000 houses, in order to attack C. fatigans in its adult stage. The fatigans mosquito is less sensitive to DDT than the anophelines and is supposed to easily acquire a strong resistance to the poison. This led to the choice of BHC, or benzene hexachloride, as the residual poison to be used, on the theoretical basis of 300 mg. of its gamma-isomer per square meter. At Belem, the 43,000 dwellings will be sprayed four times a year, which will

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make a total of 172,000 applications of insecticides per year, using about 12,900 kg. of BHC. As a complementary measure, the known carriers of microfilariae will be treated with hetrazan, a commercial brand of 1-diethylcarbonyl-4-methylpiperazine, with the hope of bringing the number of carriers well below the minimum necessary to the infestation of the vectors. This drug has the advantages of being well tolerated in therapeutic dosages and easily taken by the oral route.

As an experimental measure, there are also plans to carry out control measures against the larva of C. fatigans in about 10% of the total area, in order to ascertain the efficiency of the domiciliary disinsectization, and eventually to decide whether it would be necessary to use the two methods combined to obtain complete control of bancroftiasis.

ITALY

Medicosurgical Society.—The Calabrian Medicosurgical Society held a meeting in Reggio Calabria, under the chairmanship of Professor Salvadori. Dr. Ferrara discussed the modern aspects of fibrinous pneumonia, advancing a new concept on the mechanism of its resolution. According to the speaker, the process of resolution is not connected with the granulocyte autolysis of the exudate, as is generally believed, but with the action of a specific fibrinolytic enzyme. This is, as a rule, contained in the circulating blood and in the pulmonary tissue when the blood again flows into the pulmonary area, which has been ischemic because of hepatization.

Dr. Barone reported on "giganto-follicular" splenomegaly and described one case; he considered this morbid manifestation a genuine splenic form of giant follicular lymphoma (Brill-Symmers disease). He discussed the hypotheses advanced to explain the pathogenesis of this obscure disease, i. e., the hyperplastic concept based on toxins and the neoplastic concept. The afore-mentioned case was diagnosed as nodular reticuloendotheliosis of the spleen associated with protein thesaurosis.

Dr. Timpano discussed two subjects of a practical nature, the pneumothorax not detected by roentgenographic investigation and the therapeutic pneumothorax instituted in the outpatient medical clinic. He pointed out that there are cases of pneumothorax in which the gas is not visible on the screen and during radiography, even after several months of treatment. Because, in these cases, an exact idea of the pneumothorax efficiency cannot be obtained, the physician, who does not have a guide in the procedure to follow, is compelled to depend on manometric pressures and on therapeutic responses. There are various causes for this exceptional roentgenographic behavior. Among these is the varying density or the varying thickness of the pleurae compared with the density of the pulmonary parenchyma, the adhering fibers, a "partial" pneumothorax, and a "blocked" pneumothorax. In these cases, one must be cautious in judging the surgeon and denying the presence of a pneumothorax just because the gas is not visible on the screen. In these patients, it is not wise to apply excessive pressure just because one wants to see the gas. Dr. Timpano then reported on his personal experience with 306 patients in whom he began pneumothorax in the outpatient medical clinic. He arrived at the following conclusions; the beginning of pneumothorax in the outpatient medical clinic does not cause, in general, severe reactions, even in patients who walk home or take the train or bus. The main thing is to know how to select the patients. In general, patients with initial exudative forms or with confined bronchopneumonic forms, who do not have abnormal or subfebrile temperature, are indicated. The reasons for beginning pneumothorax in the outpatient medical clinic is the patients' financial status or the scarcity of hospital beds.

In the discussion that followed, Dr. Galifi pointed out that in patients in whom a pneumothorax is not detected by roentgenograms, the phenomenon is linked to a process of fibrinous pachypleuritis of the parietal pleura that does not involve the visceral pleura. The layer of parietal fibrin disguises the pneumothorax chamber; in these cases, it is necessary to search for the margin of pulmonary compression in oblique projections. Dr. Romeo called attention to the opaque pneumothorax described by Torelli, who explains it as a modification of the normal radiological finding, consisting of an inversion of the ratio between the excessive clearness of the pneumothoracic bolus and the pulmonary opacity. Dr. Barbieri emphasized the brilliant results that may be obtained in nursing infants with bilateral hypotensive pneumothorax.

Dr. Geraci reported on his experiments in treating trachoma and other infections of the eyes with terramycin. Local application of an ointment containing terramycin in doses of 1% or 2% was carried out in 20 patients. Clinical and therapeutic results were encouraging. Dr. Cinelli reported on a case of tularemia observed in a young woman who was bitten by a dog (second carrier) that had eaten a quail. There was an ulceroglandular lesion on the bitten hand, and subsequent enlargement of the epitrochlear and axillary lymph nodes. A serologic test was positive on the fifth day, and a tularin reaction was positive on the third day. After diagnosis was made, the disease was successfully treated with chloramphenicol (chloromycetin®) in doses of 3 gm. daily.

Drs. Negri and Pecchiai studied bone marrow smears in a group of children with acute leukemia. On the basis of the results obtained employing various histological techniques, the speakers concluded that it is impossible to classify the cells of acute leukemia of children with any element of the normal hematic series. Therefore, they propose calling the cells leukoblasts, new cells that have gone astray during their metabolism. This is demonstrated by the high content of ribonucleic acid and by the accumulation of glucidic masses with a positive reaction to Schiff's test. Dr. Pecchiai discussed the concept of "soiling of the protein plasma" that was recently introduced by Poli and is characterized by an increase in the iontophoretic tracing of the alpha and beta fractions. This increase is almost always associated with neutrophilic leukocytosis with increased destruction of granulocytes.

Dr. Carere-Comes reported on vitamin B_{12}, a new antianemic factor that he isolated and that proved to have a definite activating action on glycolysis in vivo as well as in vitro, in the treatment of patients with moderate diabetes.

LONDON

Notable Pediatric Centenary.—Great Ormond Street is one of the drearier of London's streets, but it is probably one of the best known throughout the world—and certainly in pediatric circles, where it is synonymous with the world-famous children's hospital it houses, the Hospital for Sick Children. In February the hospital attained its centenary; it was opened on St. Valentine's Day, 1852. It was the first children's hospital in the British Isles, and the credit for its founding goes to Dr. Charles West. The task was not an easy one, and many reasons were advanced why a hospital for children was undesirable. West, however, persisted and finally gained the influential support he required: a contribution from Queen Victoria who became the first patron, an article supporting the scheme by Charles Dickens in "Household Words," and the acceptance of the presidency by Lord Shaftesbury. The first site of the hospital was 49 Great Ormond Street, a 17th century house formerly occupied by Dr. Mead, physician to Queen Anne. When the hospital was opened, it had 10 beds. In view of the subsequent history of this great institution it is interesting to note the original aims of the hospital: (1) to provide for the reception, maintenance, and medical treatment of the children of the poor during sickness and to furnish advice to the mothers of those who were not admitted; (2) to promote the advancement of medical science with reference to the diseases of childhood and to provide efficient instruction of students in these diseases; and (3) to disseminate among all classes, but chiefly among the poor, a better acquaintance with the management of infants and children during illness by employing the hospital as a school for the education and training of women in children's nursing.

After a slow start the hospital rapidly expanded. In 1858 Charles Dickens again came to the help of the hospital by presiding over a festival dinner, which raised sufficient funds to allow the purchase of adjoining property for expansion. In 1877 a completely new hospital, containing 120 beds, was opened, and 10 years later, to celebrate the jubilee of Queen Victoria, the

children of the empire subscribed money for the erection of a new wing. The main block of the present building was opened by King George VI and his consort in 1938. Further building was delayed by the outbreak of World War II, but it is hoped that the foundation stone of a new outpatient department will be laid later this year. Also included in plans for the future are buildings for the Institute of Child Health, which was founded after the 1939 to 1945 war and which, under the inspiring leadership of Prof. Alan Moncrieff, the first incumbent of the chair of child health in the University of London, has firmly consolidated the position of the hospital as the leading center of postgraduate teaching in pediatrics in the country.

Great Ormond Street is synonymous with all that is outstanding in the history of pediatrics in this country during the last hundred years. The members of its staff include some of the great names in pediatrics: Barlow, Still, and Hutchison. To amplify this aspect of the hospital is unnecessary for American readers, but brief reference may be made to Sir James Barrie's association with it, as described recently by Lord Macmillan, a former chairman of the hospital, in a letter to *The Times*. Lord Macmillan was chairman when Barrie presented all his copyrights in "Peter Pan" to the hospital. Barrie insisted that "Peter Pan" "must really come in person to the hospital," and it was therefore arranged that a performance of the play should be given in one of the wards. The cast for the occasion was a brilliant one: Sir Gerald du Maurier, Miss Marie Lohr, and Miss Jean Forbes-Robertson as Peter Pan. Barrie himself was present, but at the end of the performance he could not be found. Immediate search was made, and "at last he was discovered all by himself in one of the wards, talking to the little patients who had not been able to see the show."

Leonardo da Vinci Quincentenary Exhibition.—The quincentenary of the birth of Leonardo da Vinci is being celebrated in London by a fascinating exhibition of his work at Burlington House. This has been arranged jointly by the Royal Academy of Arts and the Science Museum. The exhibition is divided into three parts: his drawings, copies of his drawings derived by his pupils from lost works, and his scientific work. This last category provides a fascinating survey of the great artist's scientific genius. Most of Leonardo's existing original anatomic manuscripts are in the royal library at Windsor, and many of them are on show in the exhibition. The greater number of these portray dissections of muscles and bones; all are highly artistic, and many are very accurate. It is in the drawings of the internal organs that one encounters a curious mixture of scientific observation and traditional belief. Thus, in the "female situs figure," original observation is shown as it is in the relative accuracy of the shape and size of the kidneys, liver, and spleen, but the ovaries are shown as being alongside the cervix and connected to it by a duct. Leonardo's mechanical ingenuity is well illustrated in the drawing of the ventricles of the brain as outlined in wax. These wax models were obtained by pouring molten wax into the ventricles, allowing it to harden, and then dissecting the brain. His drawing of "the child in the womb" shows that, differing from traditional authority, he appreciated that the human uterus contained a single cavity, but the placenta shows the scattered cotyledons of the cow. An accurate drawing of the maxillary sinus is of interest in view of the fact that it was not until 1651, that it was rediscovered by Highmore, a physician in Dorset, after whom it is still often referred to as the antrum of Highmore. Perhaps the most impressive of all his drawings are those of the heart; these demonstrate that Leonardo appreciated that the heart consisted of four main chambers and not two as tradition taught. Equally striking, however, is his detailed treatment of the aortic and tricuspid valves, and chordae tendineae and the moderator band.

Compulsory Use of Fireguards.—The Heating Appliances (Fireguards) Bill, which has government approval, has just received its second reading in the House of Commons. The bill would give power to the Home Secretary and the Secretary of State for Scotland to make regulations concerning standards of construction and fitting of fireguards for electric and gas fires and oil stoves. After a fixed date, it would be an offense to sell any of the appliances covered by the regulations unless they were adequately guarded according to the standards stated in the regulations. The British Standards Institution has already issued safety specifications for gas and electric fires. The only legislation that exists at the moment is under the Children and Young Persons Act of 1908. This deals with unguarded coal fires, but, under the act, it is not an offense for a fire to be without a guard unless a child is burned.

The "General Practitioner's Disease?"—According to a detailed statistical analysis published in the *British Medical Journal*, the probability that a male medical practitioner "under 45 years of age who had not yet been attacked by it will be attacked by clinical coronary heart disease (i. e., coronary thrombosis, acute myocardial infarction, angina pectoris) before he reaches 65 are about one in five, or 20 per cent. The chances that the individual practitioner under 45 years of age will die of it are about one in fourteen, or between 7.1 per cent and 7.5 per cent." These results are based on an analysis of the records of 6,000 male medical practitioners aged 35 to 64, members of an assurance society, who "held 'immediate' non-cancellable sickness insurance, providing benefit on receipt of a medical certificate, for periods of incapacity to work which last seven days or more." The society also has knowledge of all deaths of its members. The average annual incidence of first clinical attacks of coronary heart disease during 1947 to 1950 increased with age, from 2.2 per 1,000 at 40 to 44 years to 16.6 per 1,000 at 60 to 64 years. The coronary death rate during this period also increased with age, from 0.9 per 1,000 at 40 to 44 years to 7.4 per 1,000 at 60 to 64 years. Of the patients with "coronary thrombosis," 30% died during the first six days of the first attack, and another 8% died during the remainder of the first month, a total of 38%. Subsequently, the prognosis improved rapidly; 2% died during the remainder of the first year, and an average of about 2% died annually during the next six years. Of the patients who survived the first attack of "coronary thrombosis," about half had no further absence from work because of coronary heart disease (or its complications) that lasted as much as a week during the next six years. Of the patients with angina pectoris, 11% died during the five years from the onset; the prognosis for life being about the same as for those with "coronary thrombosis" who survive the first month. The incidence of coronary heart disease (standardized rate per 1,000 men aged 40 to 59) was 7.1 for general practitioners, 3.3 for other physicians, and 2.5 for a miscellaneous nonmedical group.

Tea Addiction.—In a debate in the House of Commons recently, one of the medical members of Parliament pointed out that, with an average consumption of 3 oz. of tea a week, the total national intake of pure caffeine is about 50 million pounds annually. Some persons consider 10 cups of tea a day as normal consumption. As there is about 1.5 grains (0.09 gm.) of caffeine in an average strong cup of tea, this means that these persons are taking 15 grains (0.97 gm.) of caffeine daily. The maximum medicinal dose of caffeine a day is 5 grains (0.32 gm.). He stated: "So it is apparent that some people who would never think of drinking beer intoxicate themselves by taking an excessive amount of caffeine through their tea. Then they pose before us as virtuous people, forgetting that they are the truest type of drug addicts because caffeine is a true cerebral stimulant, whereas the amount of alcohol in beer, lager beer and cider . . . is not stimulating and is really ultimately depressing."

Sir Charles Sherrington.—The death of Sir Charles Sherrington, at the ripe old age of 94, means the passing of the greatest neurophysiologist of his age and one who "in his retirement, with the pen of a poet and the brain of a scientist, earned the honourable title of the Philosopher of the Nervous System." It was in 1895 that he was appointed to his first chair, the chair of physiology in the University of Liverpool, and, in 1913, he accepted an invitation to the Waynflete chair of physiology at Oxford, where he remained until his retirement in 1936. The honors bestowed on him typified the outstanding position he occupied in the scientific world, honorary degrees from 22 universities, president of the Royal Society (1920-1925), a member of the Order of Merit (O.M.), and a Nobel Prize winner. His students are now leaders in their specialty in all parts of the world, and the United States has some of the most distinguished in John Fulton, Stanley Cobb, the Hoff brothers, and Derek Denny-Brown, to mention only a few. These, and many others,

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are a striking tribute to the great tradition built up by Sherrington in the sphere of neurophysiology, and it may well be that his final niche in the temple of time will be as "the philosopher of the nervous system." As is stated in *The Lancet:* "To Sherrington's years of research we owe a wealth of careful observation, elegant demonstration, and fruitful synthesis. To his years of reflection we owe his assessment of what remains unknown, and his assertion that mind remains apart—supreme and untouched. In his own words: 'mind for anything perception can compass, goes therefore in our spatial world more ghostly than a ghost. Invisible, intangible, it is a thing not even of outline; it is not a 'thing.' It remains without sensual confirmation, and remains without it for ever. Stripped to nakedness there remains to it but itself. Desire, zest, truth, love, knowledge, 'values,' and, seeking metaphor to eke out expression, hell's depth and heaven's utmost height. Naked mind."

MEXICO

Correlation Between Liver Function Tests and Histological Changes of the Liver.—To study the relation between the anatomic lesion and the functional disturbances of the liver, Sepúlveda, Rojas, and Rivera, from the Hospital de Enfermedades de la Nutrición in Mexico City, selected 62 patients in whom liver biopsy was performed between May, 1949, and February, 1950. The histopathological pattern of the biopsy was compared with the results of the liver function tests done prior to the biopsy. Only patients with chronic liver disease were studied, and, according to the histopathological findings, the following classification was made: Laënnec's cirrhosis, 25; postnecrotic cirrhosis, 5; diffuse sclerosing hepatitis, 3; biliary cirrhosis, 2; cardiac cirrhosis, 1; and post-hepatic jaundice of benign origin, 4, of malignant origin, 1, secondary to brucellosis, 6, due to malnutrition, 7, and other forms, 8.

The severity of the hepatic lesion could not be accurately evaluated in numerical terms but only approximately estimated. The pathological specimens were sectioned at 5 μ and routinely stained with hematoxylin and eosin. In some cases other techniques were added: Río Ortega for collagen, sudan IV for lipids, Mallory's phloxine methylene blue to demonstrate more satisfactorily the alcoholic hyalin; Wilder for precollagen, and Perls' for ferric pigments.

The results of this study prove that there is no absolute correlation between the degrees of cellular damage and of functional disturbances that can be demonstrated by present techniques. This is especially true of the group with moderate changes. These observations agree with those of many other authors who have stated that it is possible to find variable degrees of functional disturbance in the presence of the same liver cell damage and vice versa; these results can be explained by the great functional reserve and regenerative power of the liver, which can compensate for the functional deficit and thus produce the apparent discordance between the anatomic picture, as judged by the liver biopsy, and the liver function, as determined by laboratory tests. It must be stated that this discordance does not imply lack of sensibility of the tests nor lack of specificity, as the morphological study is not the only basis by which hepatic changes can be determined. It is generally accepted that the study will not show a strict numerical evaluation but rather an estimative comparison and that new histochemical techniques will probably permit a better appraisal of the structural damage and establish its correlation with the functional disturbances.

It was noted that certain isolated tests were altered more in relation to the anatomic lesion than others, depending on the type and phase of the disease, not because they have greater sensibility, but because they have different mechanisms. The fact that bromsulfalein retention is extremely useful in evaluating the functional status of the liver has been confirmed in the present study in which the bromsulfalein test was the most concordant with the histological appearance.

The cholesterol esters of the serum were not altered in patients with mild histological changes, but they did vary with marked parenchymal damage. A persistently low level of the serum cholesterol esters was considered as a useful sign of poor prognosis in liver disease. To explain this, the hypothesis was offered that in mild cellular damage the substances that inactivate esterase, which in turn brings about the esterification of cholesterol, either are not formed or are found in small quantities.

No correlation was found between the prothrombin time and the degree of cellular damage. Prolonged prothrombin time values were frequently found in the absence of liver damage or biliary obstruction. In other cases, the test was within normal limits despite the evidence of cellular damage and hepatic dysfunction in other tests.

Minimum levels of direct serum bilirubin found in the majority of the patients did not correspond to the degree of cellular damage. It is certain that these results were due to the type of disease under study. In 81% of the cases with cellular damage, no direct serum bilirubin was found. It is possible that the explanation of this finding may be had in the ideas of Watson, who has insisted that bile regurgitation occurs through the bile capillaries rather than through the damaged hepatic cells. In this manner, direct bilirubin may be detected in the serum in the presence of normal or damaged liver cells. Watson has also indicated that frequently the lesion of the canaliculi cannot be demonstrated on a microscopic slide and that these are cases of increased permeability of the bile capillaries.

In the present study, the serum albumin level had little relation to the degree of cellular damage, and the correlation diminished as the anatomic lesion advanced, suggesting that a disturbance of the albumin synthesis occurs with minimal cellular damage, a fact already pointed out by Lichtman and ratified by Gray's electrophoretic studies; nevertheless, this disturbance did not increase in proportion to the anatomic lesion. This cannot be generalized in view of the fact that in acute virus hepatitis the serum albumin values, except in very severe cases, are only slightly altered.

It was found that tests with the serum globulins were among those that varied in direct relation to the hepatic lesion. This seems strange because the serum globulins have been considered to be substances formed by the reticuloendothelial system, which would indicate immunologic reactions; however, the frequency with which Kupffer's cells are damaged in hepatic disease must be considered. On the other hand, the histochemical studies of Szanto have demonstrated the presence of large quantities of ribonucleic acid in these cells in the course of liver disease, a fact that indicates that proteins are being produced.

Knowledge of the prominence and mobilization of Kupffer's cells was regarded as useful data for evaluating the anatomic lesions. Thus, in the presence of hyperplasia of the reticuloendothelial system of the liver, it is not surprising that the serum globulins should increase, and this rise in the serum globulins could be taken as an indirect sign of liver damage. Unfortunately, the test is nonspecific, there being increase of the serum globulins in any condition in which there is hyperplasia of the reticuloendothelial system.

The flocculation tests were not strictly parallel to the structural lesion. The cephalin cholesterol flocculation showed a more direct relation to the degree of structural damage, while the thymol turbidity and flocculation were more sensitive to minimal structural changes, and it was concluded that perhaps these procedures detect liver disease but are not useful in determining its severity. Accordingly, it was observed that in a large number of cases with minimal to severe lesions the tests were strongly positive. These observations agree with those of Hanger, who has stated that his test, when positive, is related to an active hepatic cell lesion, and with the hypothesis of Kunkel and Popper, who believe that thymol turbidity and flocculation tests measure a regenerative function, which, in turn, implies previous damage of the gland. It must not be overlooked that these tests are nonspecific and may be found disturbed in any condition in which there is hyperacidity of the reticuloendothelial system.

A paper in which all these observations are carefully analyzed will be published in the April issue of the *Revista de Investigación Clínica.*

CORRESPONDENCE

PHYSICIANS FOR GUAM

To the Editor:—The urgent need for physicians in Guam was reported by that island's government in an announcement appearing in an issue of THE JOURNAL for September, 1951. Inquiries were invited by the governor, Mr. Carlton Skinner.

For several weeks I corresponded with the director of personnel at Agana in regard to a position. The fact that an applicant was being considered to fill a medical service need, however, implied that some professional official qualified to evaluate and pass on medical credentials was the ultimate appointing authority. Otherwise, the assumption of such responsibility by lay officials would suggest a policy of questionable motivation.

Yet, in March, 1952, a trip to Agana was required to disclose at the Guam Memorial Hospital the existence of a director of medical services, who, however, had no more responsibility for the appointment of his staff of European "DP" physicians than he had for the appointment of the writer of this protest. If the personnel office of the Guam government disclaims responsibility for the selection of medical personnel, then an explanation for not affording applicants contact with the director of medical services is due. The fact that no official source disclosed the complexion of the existing medical staff appears to require no explanation.

No deliberate misrepresentation of conditions at the Guam Memorial Hospital is claimed; the fact of withholding pertinent data speaks for itself. It is, however, specifically charged that only in the most reduced circumstances would a self-respecting physician of experience and background find acceptable the professional working conditions and the living accommodations encountered at this government-operated institution.

If this charge is denied by the personnel department, then its incompetence to select professional personnel is completely obvious, and if the situation as witnessed at Agana constitutes a laboratory test of Oscar Ewing's theories, the welfare and morale of the Guamanian public is not being served any more than is the best interest of a medical publication affording space for the publicizing of such a recruitment campaign.

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ATROPINE IN CANCER

To the Editor:—I am collecting information about the action of atropine and its derivatives in the palliative treatment of cancer, but the literature does not seem to contain any references in this respect, and I should be grateful for any information. The theoretical rationale for using atropine is the abnormal metabolism of choline-containing phospholipids in tumor tissue, with possible production of abnormal choline metabolites, the action of which may contribute to the nervous manifestations of cancer cachexia and may be inhibited by the choline antagonist atropine.

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PROGRESSIVE RESISTANCE EXERCISES

To the Editor:—The paper of Dr. A. L. Watkins (Practical Applications of Progressive Resistance Exercises, *J. A. M. A.* **148**:443-446 [Feb.] 1952) merits special consideration by its stressing the use of this form of exercise not only in traumatic conditions but also in neurological and medical cases. This method shortens considerably the convalescence of the conditions mentioned.

Dr. Watkins, speaking of anterior poliomyelitis, points out "that for this method of exercise to be effective the patient must be able to cooperate fully and make a maximum muscle exertion, so that it cannot be employed in the treatment of infants and young children."

My experience does not agree with this statement. By holding the body and involved muscle (or muscle group) in optimal position on a powder board, exerting optimal tension on the muscle at the optimal angle for the joint to be moved, and applying the resistive weight, it is possible to use progressive resistance exercises for most poor to fair muscles of young children without their cooperation.

I should like to add that in hemiplegia I often see satisfactory results with this method by utilization of some pathological reflex phenomena, e. g., training of the triceps muscle with the help of the tonic neck reflex or employment of Strümpell Bergsteiger reflex for improvement of the tibialis anterior.

Even in subacute rheumatoid arthritis it is possible to use progressive resistance exercises after spraying painful joints with ethylchloride.

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AVICENNA

To the Editor:—In the foreign letters, page 181 of THE JOURNAL, Sept. 8, 1951, Dr. S. Munther, the main speaker at the second Congress for the History of Medicine convened in Tel-Aviv in May, 1951, stated that "Ibn Sinai known in the literature under the latin name of Avicennae was a Jewish Persian Physician."

Ibn Sinai was born a Moslem Arab from a Persian father converted to Islam. I append some references that indicate that Ibn Sinai is an Arab Moslem physician.

1. Encyclopaedia Britannica, volume 2, page 814, says that "Avicenna (Abu-'Ali al-Husain ibn 'Abdallah ibn Sina) the greatest of Arabian philosophers in the East, and a physician in whom Arabian medicine reached its culmination . . . at the age of ten [he] was well acquainted with the Koran and Arab classics." 2. On page 187 of volume 2 of the same encyclopedia it is stated that "Unquestionably the most illustrious name amongst the Oriental Muslims was Avicenna." 3. The American Illustrated Medical Dictionary, 20th edition, (Dorland), on page 186, says that Avicenna was the "most celebrated Arabian physician and philosopher, 980-1037, surnamed 'The Prince of Physicians.'"

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HIATUS HERNIA AND ANGINA PECTORIS

To the Editor:—In the article "Relationship of Esophageal Hiatus Hernia to Angina Pectoris" by Franklin R. Nuzum, which appeared in the April 5, 1952, issue of THE JOURNAL, one of the references, no. 11, referred to an article of mine. Later in the paper Dr. Nuzum makes the statement with reference to the incidence of hiatus hernia that "An ideal control group would consist of a large number of persons with no symptoms in whom a search for hiatus hernia was made. I have been unable to find reports of any such study."

Actually, such a study was reported by Dr. Harold I. Amory and myself in the *Archives of Surgery* (**60**:1045-1050 [June] 1950). Three hundred ambulatory patients over the age of 50 and without significant gastrointestinal symptoms were studied specifically for the presence of hiatus hernia, which was found in four patients, or 1.3% of the group.

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BUREAU OF MEDICAL ECONOMIC RESEARCH

PENSIONS FOR PHYSICIANS

The following is an abstract of a statement by Frank G. Dickinson, Ph.D., Director, Bureau of Medical Economics Research, on behalf of the American Medical Association regarding H. R. 4371, 82nd Congress, before the committee on Ways and Means of the House of Representatives, May 13-14, 1952. The complete statement with tables and footnotes will be reprinted as Bulletin 89, which can be obtained from the Bureau office on request. Dr. David B. Allman also appeared on behalf of the American Medical Association and reviewed the history of the interest of the Association as shown by the actions of the House of Delegates and the Board of Trustees.

This is an excellent bill, which will meet an evident need, but its provisions are too generous for the young and too restricted for those who are now old. In addition to changes in the excludable amounts specified in the bill, it would also be desirable to have a reasonable "carry-over" provision and to permit persons who do not belong to "a bona fide agricultural, labor, business, industrial, or professional association or similar organization" to participate in the benefits contemplated by this bill.

I shall enumerate the proposed changes without attempting to indicate the exact language needed:

1. The provision for the amount excludable annually (10%, or $7,500, whichever is the lesser) should cease to apply after the aggregate of a person's annual exclusions thereunder reaches a total of 20 times $7,500. I shall refer to this change as "the lifetime limitation of $150,000."

2. There should be added a special rule to provide for additional excludable amounts for those who are now over 55 years of age. I suggest that this additional amount should be equal to 1% of the taxpayer's earned net income, or $750, whichever is the lesser, multiplied by the number of years of his age in excess of 55 determined as of Jan. 1, 1952, but not in excess of 20 and, further, that the additional excludable amount shall not apply to taxable years after he reaches age 75. I shall refer to this change as the "past service credits" limitation and will show how it applies only to those who are now over age 55.

3. In order to carry out this second proposal for "past service credits" it would be necessary to alter the bill so that amounts excluded would be taxable as current income if they were realized in less than five years after they were excluded. The "past service credits" provision that I am suggesting would encourage exclusions to be made after age 60, and they should not be realized in cash or as an annuity in less than five years if the taxpayer is permitted to pay only the capital gains tax on those amounts.

4. The taxpayer should be given some choices in the investment of his excludable amounts. The trust arrangement described in the bill is satisfactory for those who want to have their funds accumulate in that manner. But persons who do not belong to associations should be permitted to purchase restricted retirement annuity contracts, which are just as restricted as to distribution of proceeds as is the restricted retirement fund. Furthermore, the individual should probably be permitted to set up a trust fund in any bank of his own choosing.

5. There should be a carry-over provision that would permit the taxpayer to exclude from his next year's income or from his next two years' incomes the amounts excluded in any one year over and above the limits set forth. No specific period of years is suggested for the carry-over period. This provision, along with the others suggested above, would provide reasonable limits plus flexibility.

6. Finally, the preamble to H. R. 4371 fails to describe its full purpose with the suggested changes. I would suggest the following substitute language for the preamble: "To remove the discrimination against certain persons in regard to the establishment of private pension plans by permitting the postponement of income tax with respect to a portion of earned net income paid to a restricted retirement fund or as premiums under a restricted retirement annuity contract."

I shall first discuss the effects of the original and suggested limitations on the maximum annuities that can reasonably be expected, estimate the average annuities, state and answer some questions, and then proceed to the general reasons for the need for this legislation.

PART 1: MAXIMUM VS. AVERAGE ANNUITIES

Although the first consideration must obviously be the maximum annuity that can be expected under this legislation, it must be realized that probably no one will ever obtain that maximum. My discussion of the maximum annuity will, therefore, be highly theoretical and will locate a theoretical, unattainable boundary. There will be, of course, much more interest in the average

TABLE 1.—*Maximum Pensions*

Maximum Pensions	1943-47 New Plans	1948-50 New Plans
Maximum dollar pension		
$18,000—$35,000	9%	14%
12,000— 18,000	20	12
9,000— 12,000	12	7
Less than 9,000	22	9
Maximum annual earnings recognized in determining pensions		
$30,000—$60,000	4	3
20,000— 30,000	4	1
10,000— 20,000	4	7
Less than 10,000	..	3
Maximum pension as a percentage of compensation	1	2
No limitation as to maximum pension	24	42
Total	100%	100%

* From "A Study of Industrial Retirement Plans," New York, Bankers Trust Co., 1950, p. 14.

TABLE 2.—*Future Service Benefits*

Pensions, Exclusive of Social Security, as Percentage of Average Compensation	Percentage of Plans in Each Benefit Category Based on 30 Years of Future Service: Average Annual Compensation $2,000	$3,000	$5,000	$15,000
20% and under	8%	10%	1%	3%
21%—25%	29	27	6	2
26%—30%	43	45	16	11
31%—35%	5	4	28	6
36%—40%	6	6	20	9
41%—45%	4	4	19	36
46%—50%	2	2	6	9
51%—55%	..	..	1	16
56% and over	3	2	3	8
Total	100%	100%	100%	100%

* From "A Study of Industrial Retirement Plans," New York, Bankers Trust Co., 1950, p. 12.

pension that can reasonably be expected. The basic purpose of the limitations in this bill with the changes suggested is to prevent, by indirection, the taxpayer from developing a retirement annuity or pension starting at age 70—not the traditional age 65—of more than approximately $1,000 per month.

The committee must bear in mind that the amount of the annuity is not the benefit that this bill would give the taxpayer, for the taxpayer must use his own earned income, not a part of his employer's gross income. The primary benefits are: (1) encouragement of savings for the needs of old age, a psychological benefit, and (2) a potential reduction in lifetime income taxes. But the annuity itself is not the benefit.

How does a pension of $1,000 per month starting at age 70 compare with the maximum amount of pension that can be developed under industrial pension plans approved under Section 165 of the Internal Revenue Code? According to the 1950 edition of "A Study of Industrial Retirement Plans" (Bankers' Trust Company, New York), 42% of the new plans (1948-1950) do not provide any limitations on maximum pensions (tables 1 and 2). In addition, 14% of the new plans limit the maximum

pension to from $18,000 to $35,000 per year, and 12% limit the maximum pension to from $12,000 to $18,000 per year. Thus, according to their report, only 32% of the plans limit the maximum pension to less than $12,000 a year.

Generally, we can say that the Reed-Keogh Bill, with changes suggested, would establish a limit on annual pensions that is less than the dollar limit in 68% of the new pension plans approved during 1948 to 1950 under Section 165 of the Internal Revenue Code. In this comparison five points should be borne in mind.

First, the employer does not pay all of the cost; some students and practicing actuaries use a two-to-one ratio as a rule of thumb; that is, the employer pays about twice as much as the employee under most pension plans. Accordingly, some would argue that our maximum pension of $12,000 per year should be compared with a maximum pension of $18,000 per year in an industrial pension system from the standpoint of tax deferment.

A second point is that we are talking about a maximum pension of $1,000 per month starting at age 70, whereas 88% of the new pension plans approved during 1948 to 1950 specify age 65 as the normal retirement age. As you know, a pension starting at age 65 costs more than one starting at age 70; at prevailing rates charged by insurance companies for a cash refund annuity, the single premium at age 65 is about 10.6% higher than the single premium at age 70.

A third point is that the cost of an annuity for a female is higher than for a male, and the general maximum of $1,000 a month starting at age 70 for males means a lower maximum for females under this bill. The Bankers' Trust Company study seems to imply that their data on maximum pensions refer primarily to males, but I am not completely sure of this. At any rate, a pension of $1,000 per month for a female requires larger accumulations than a pension of equal amount for a male and all of my computations are based on the rate for males.

A fourth point is that this general limit of a monthly cash refund annuity of approximately $1,000 starting at age 70 would be, of course, only 16% of $75,000, the minimum annual earned income required for the maximum annual exclusion, $7,500, from taxable income. As will be shown later, a person with an earned income of $37,500 every year for 40 years could obtain a pension of almost the same amount starting at age 70, and, thereby, his pension would be approximately 32% of his "average" annual earned income. The maximum would be about 32%. According to table 2, only 3% of the new plans aim at a comparable pension percentage of less than 20.

A fifth point is that industrial pension systems usually base the amount of pension on an average of the highest 5 years of earnings, or the highest 5 consecutive years of earnings, or the last 15 years of earnings; few of the newer plans base the pension on an average of earnings for every year. Under this bill the latter rule is followed, and the excludable amounts will be low for the typical person in any class during his 20's and 30's, when his earnings are relatively low.

In this entire discussion I shall use prevailing annuity premium rates. If the interest rate in future decades should rise and the mortality remain constant, the annuity premium rates or pension costs would decline. A decline in mortality rates among persons receiving pensions would, of course, tend to increase future annuity rates. An increase in the premium rate means a decrease in the monthly benefit that can be purchased with a single premium of $1,000.

A list of the single premiums used in my computations may be helpful. For a cash refund annuity of $1,000 per month the single premiums used are: age 65, $222,720; age 70, $201,456; and age 75, $181,692. Although I have not used the "installment refund" or "no refund" annuity in my computations, the comparable single premiums may be useful. For an installment refund annuity of $1,000 a month the single premiums are: age 65, $210,360; age 70, $187,032; and age 75, $164,772. For a "no refund" annuity of $1,000 a month the single premiums are: age 65, $159,072; age 70, $132,348; and age 75, $107,784. I have used the cash refund annuity because it is the type that most persons would elect. Under the "no refund" type no payments are received after the death of the annuitant. Obviously this is the cheapest of the three types. This type has the disadvantage that it does not fit the purposes and the procedures of this plan, which encourages a voluntary system of pensions that can be viewed as either a savings plan or an annuity plan. The savings feature is so strong that only the cash refund annuity seems to qualify. Perhaps a case could be made for the installment refund, which provides that the monthly annuity shall continue after death until the sum of the monthly amounts equals the single premiums. The cash refund annuity provides that this difference be paid in cash at the time of death instead of being paid in installments.

PART 2: QUESTIONS AND ANSWERS

1. What is the effect of the lifetime limit of $150,000? Suppose a taxpayer had an earned income of $75,000 every year from age 26 to 65, an almost unimaginable experience. Without this lifetime limit he could exclude $7,500 a year from age 26 to age 65 (inclusive), or a total of $300,000 during his lifetime. His cash refund annuity would be $2,270 a month starting at age 65 and $2,840 a month starting at age 70. These high amounts would be, in our opinion, contrary to the public interest. We have insisted on a lifetime limit on maximum annual exclusions.

The lifetime limit of $150,000 will prevent him from paying $7,500 in more than 20 years, half of the traditional 40 year working lifetime. If he were to start at age 32 and exclude $7,500 in alternate years, his lifetime excludable total would be $150,000 and his pension starting at age 70 would be $1,239 a month. For computing pension benefits the lifetime limit does, in effect, cut the annual dollar limit in half—from $7,500 to $3,750; or it cuts the "excludable years" from the traditional 40 working years to 20. It has this general effect while creating flexibility. If the taxpayer made the 20 annual payments of $7,500 from ages 35 to 54 (inclusive), his monthly pension starting at age 65 would be $1,129, or, starting at age 70, it would be $1,412. In a less unlikely case a person would exclude the maximum from ages 45 to 64 or from ages 51 to 70.

Thus the general effect of the lifetime limit of $150,000 is to make it impossible for even a person with an annual earned income of $75,000 every year to obtain a pension starting at age 70 very much in excess of $1,000 per month. That is the major purpose of the lifetime limit of $150,000.

One important feature of the lifetime limitation might be overlooked. The limitation is a maximum dollar amount. It does not also limit the percentage, although the annual limit is stated as $7,500, or 10%, whichever is the lesser. Thus, there is no lifetime percentage limitation; the counterpart would have been that the lifetime sum of the percentages could not exceed 20 times 10, or 200. If a maximum limitation had been applied to the percentages as well as to the dollars, persons receiving annual earned incomes of less than $75,000 would have been handicapped severely. Making the limitation apply only to 20 times the annual dollar maximum gives persons of lower incomes an opportunity to pay in more years and thereby achieve higher pensions. For example, take the case of a man who earns $37,500 a year every year from age 27 through age 65. He could make 40 payments of $3,750 totaling $150,000, which would finance an annuity of $1,135 per month starting at age 65, or $1,420 per month starting at age 70. The lifetime sums of his exclusions would be $150,000 and 400% of annual incomes. Other illustrations, using lower earned incomes, would demonstrate that this bill with the suggested changes would benefit the eligible taxpayers in the lower income groups.

2. How much would the annuity be increased if the computations were made for different types of annuities—no refund and an installment refund—without the lifetime limitation? Without the lifetime limit of $150,000 a taxpayer could pay $7,500 annually from age 26 to 65 if he earned $75,000 every year and obtain a monthly no refund annuity of $3,178 or a monthly installment refund annuity of $2,403 starting at age 65. As already mentioned, the cash refund annuity for this man would be $2,270 starting at age 65. A cash refund annuity has been used in all of these computations because, among other reasons, it is the type that most persons would elect.

3. What is the effect of the past-service credit—the special rule that permits additional excludable amounts for persons over age 55 when the act first becomes effective? The extra amount is $750 or 1%, whichever is the lesser, multiplied by the difference or excess in years between the attained age when the act first becomes effective and age 55, with a maximum multiple of

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20 (again) and with the last taxable year being the year when the taxpayer attains age 75. During 1953 the maximum extra excludable amount and the corresponding maximum extra excludable percentage of earned income will be determined and will remain unchanged as the taxpayer approaches age 75, after which they will become zero. (The "normal" amounts could be excluded at ages above 75.) The effects of this past-service credit, a feature of most industrial pension plans approved under Section 165 and an outstanding feature of the O. A. S. I. primary benefits under the Social Security Act, are set forth in table 3.[1] Past-service credits are very costly in any pension system. The normal pension starting at age 75 derived from the normal contributions are shown in column 9 of table 3. A person aged 56 when this act becomes effective could exclude annually $7,500 plus $750 and accumulate enough in the trust fund to purchase a monthly annuity starting at age 75 of $1,054 from the "normal" contributions, plus $105 from the additional contributions, making a total monthly annuity of $1,159. An examination of column 11 will show that, for persons aged 56 to 65 when this act becomes effective, the real effect of the past-service excludable amount is to bring the monthly annuity starting at age 75—an extremely high age—up to little more than $1,000 per month. The general effect, therefore, of these additional excludable amounts, which I have called past-service credits, is to enable many of those who are now above 55 years of age to achieve an annuity of little more than $1,000 per month starting at the high age of 75 if their annual earned income is $75,000 each year.

We support this past-service credit provision for the same reasons we support the lifetime limit of $150,000—because both are in the public interest.

4. Why choose over age 55 instead of choosing over age 50 for eligibility for these past-service credits? The primary answer to this question is that those in the age group 51 to 55 when this act becomes effective can by excluding the maximum "normal" amounts each year obtain a pension of close to $1,000 per month starting at ages 70, 71, 72, 73, or 74. The man at age 51 without benefit of past-service credit could pay $7,500 twenty times and have enough in the trust fund to purchase a monthly annuity of $951 starting at age 70; the man aged 52 could purchase a monthly annuity of $971 starting at age 71; the man aged 53, $991 starting at age 72; the man aged 54, $1,012 starting at age 73; the man aged 55, $1,033 starting at 74. Since persons in this age group (51 through 55) could finance a maximum annuity of close to $1,000 per month starting 20 years later, there is no great need for the provision for the extra excludable amounts to apply to any person below age 56 when this act first becomes effective.

5. What would be the average pension? The first four questions have dealt with maximum pensions, which are an important practical consideration only for an extremely rare case in establishing the boundaries for this voluntary pension system. It is difficult to imagine any person having an earned annual income of $75,000 every year from age 26 to 65 or from age 31 to age 70. There is not enough information available on the earned income by age groups for all earners in the United States—not simply for the self-employed alone—to prepare any careful estimates of average pensions and average amounts that could be excluded. Fortunately, the United States Department of Commerce in recent years has made surveys of the incomes of physicians, lawyers, and dentists. The average income in these surveys for each five-year age group can be used to approximate averages for the members of these three professions.

It is necessary to make several assumptions. First, I shall assume for purposes of computation that a man's earning lifetime is divided into periods of five years each, that he earns the average income for his age group throughout each period, and that he will exclude 10%—the maximum—of his earned income annually. (This is another maximum.) Second, I shall assume that he pays the annual sum into the pension fund on each birthday and that the amount accumulates at 2½% interest, compounded annually. At this point it should be realized that the over-all average professional earnings for members of each of these three professions at all ages can not be used in a simple calculation—$11,858 for physicians with major source of medical income from independent practice (excluding salaried physicians); for lawyers, $7,517, and for dentists, $7,047. I wish we could use the over-all average income. Also, it should be noted that the surveys covered the incomes of physicians in 1949, of lawyers in 1947, and of dentists in 1948—a fact that lowers somewhat the averages used in this computation for lawyers and dentists as compared to those for physicians and presents somewhat lower averages than would the 1952 averages for each profession. In order to produce some measure of uniformity, the relatively few physicians, lawyers, and dentists below 25 years of age were excluded. It is also assumed that the earned income averages by age groups remain unchanged during the next four decades; this assumption is the most unrealistic, but without it no computations could have been made. The average monthly pension starting at age 70 for the three groups (table 4) would be as follows: (1) for all physicians now in independent practice (at all ages), $208, plus or minus 10%; (2) for all lawyers now in independent practice (at all ages) $146, plus or minus 10%; and (3) for dentists now in independent practice (at all ages) $140, plus or minus 10%.

These average pensions starting at age 70 certainly cannot be regarded as exorbitant; also, they are far below the maximum pensions previously discussed. Since they are averages, some physicians, lawyers, and dentists will get more and some will get less. The actual benefits—the tax savings—might not exceed

TABLE 4.—*Some Expected* Average Results for Physicians, Lawyers, and Dentists from H. R. 4371 with Suggested Changes*

	Average Monthly Pension Starting at Age 70	Ages	Average Excludable Amount in 1953	Ages
"All" physicians.....	$208 \pm 10\%$	25 to 69	$1,286 \pm 10\%$	25 to 74
"All" lawyers.....	$146 \pm 10\%$	25 to 69	$809 \pm 10\%$	25 to 74
"All" dentists.....	$140 \pm 10\%$	25 to 69	$756 \pm 10\%$	25 to 74
A new physician.....	$465 \pm 10\%$	25	$679 \pm 10\%$	25 to 29
A new lawyer.....	$287 \pm 10\%$	25	$318 \pm 10\%$	25 to 29
A new dentist.....	$299 \pm 10\%$	25	$487 \pm 10\%$	25 to 29
	Pension at Age 75			
A physician now aged 56	$131 \pm 10\%$	..	$1,455 \pm 10\%$	..
A lawyer now aged 56	$121 \pm 10\%$	..	$961 \pm 10\%$	..
A dentist now aged 56	$72 \pm 10\%$	..	$786 \pm 10\%$	..

* Based upon average net professional income in 5-year age group reported by William Weinfeld in the **Survey of Current Business**, U. S. Department of Commerce, for physicians in 1949, lawyers in 1947, and dentists in 1948. ("Income of Physicians, 1929-1949," July 1951, pp. 9-26; "Income of Lawyers, 1929-1948," August 1949, pp. 1-7; "Income of Dentists, 1929-1948," January 1950, pp. 8-16.) It was assumed that every person in each age group would exclude the maximum amount permissible from taxable income—an assumption which makes the averages too high. The number of persons in each age group who responded to the U. S. Department of Commerce income questionnaires was used in obtaining the averages for persons at all ages in columns 1, 2, and 3. It was also assumed for the computations that new entrants into the professions were typically age 25, although it is well known that most physicians start practice several years later.

one-fifth of the amount of the pensions. No postwar income data are available for the two professions with the highest pre-World War II earnings—certified public accountants and consulting engineers. I do not know how to make similar computations for other taxpayers, but I believe that we can safely say that this voluntary pension system, which will not permit a pension of much more than $1,000 per month starting at age 70, will produce an average pension of somewhere between $150 and $300 a month; perhaps a closer approximation under the assumptions would be a range for the average pension of $150 to $250 per month. Since one of the assumptions is that the taxpayer in each of these three professions would pay the full 10% of his earned income every year into the pension trust, there is reasonable doubt that the average pension would be as high as $150 to $250 per month starting at age 70.

The monthly pension, on the basis of perpetuating the age-earnings progressions in the three surveys, starting at age 70 (in calendar year 1998) for a young man entering practice in 1953 at age 25 would be: for a physician, $465; a lawyer, $287;

1. Table 3 appears only in the reprints of this article.

and a dentist, $299. These averages represent the maximum opportunity for the average new entrant into each profession. Again, the benefit is not the pension that he could have purchased directly in the absence of this bill out of his earnings after taxes; the benefit comes only from buying these annuities before taxes.

6. How much could physicians, lawyers, and dentists exclude from their taxable incomes the first year (1953) this bill is in effect? It is hazardous to attempt to guess the aggregate excludable amount for each profession. I would prefer, therefore, to first estimate the excludable amount of an average member of each of the three professions who would exercise his rights under this bill.

(*a*) The maximum excludable amount for a physician during 1953, on the assumptions noted above, would be approximately $1,290, plus or minus 10%. I would not attempt to guess the number of thousands of physicians who would, under this bill, exclude the maximum amounts during 1953. The potential number of thousands, according to the definitions used in our computations, would be about 160.

(*b*) The maximum excludable amount for a lawyer during 1953 would be approximately $860, plus or minus 10%. Again I would not know how to estimate the number of thousands of lawyers who actually would, under this bill, exclude their maximum amounts. I judge that the maximum number in thousands would be about the same for physicians as for lawyers, 160; but this is only a guess.

(*c*) The maximum excludable amount for a dentist during 1953 would be $756, plus or minus 10%. I would not want to guess how many thousands of dentists actually would, under the bill, exclude the maximum amounts during 1953. The potential number of thousands is somewhat less than 80.

In summary, for these three professions 400 million dollars (200 plus 140 plus 60) could theoretically be excluded from 1953 taxable income, provided every member of each of these three professions excluded his maximum amount. Considering a number of imponderables and the difficulties that all citizens face in trying to set aside money for old age, I have a strong feeling that the members of these three professions in 1953 would not exclude more than 40 million dollars from their taxable incomes under the provisions of this bill. The most important of these imponderables is the unattractiveness of the trust fund as a form of investment because of the restrictions that have been incorporated in this bill—and I think these restrictions are in the public interest. I refer to the fact that one cannot borrow, one cannot use in any way the accumulations in this trust until one attains 60 years of age, except as a death benefit or for permanent and total disability. Only a small minority of industrial pension plans have restrictions anywhere near as severe.

A young man getting started in his profession at, say, 30 years of age will not find the opportunity to set aside 10% of his earned income into this fund a serious temptation to defer taxes, since he cannot touch the fund in any manner for his ordinary financial crises. What is the inducement? The bill will definitely encourage some saving for old age, but the only financial advantage, other than the capital gains option, is the privilege of paying the income tax on the amounts set aside when they are distributed to him during his retired years when presumably he will be in the lower income tax bracket. I would stress the word "presumably." There can be no tax avoidance, only deferment. The taxpayer must use his own funds, not his employer's. The taxpayer must elect to save rather than spend his own earned income. The amount of the pension is not the benefit; the benefits are the encouragement to save for retirement and the prospect of lower lifetime taxes. Specifically, the gain to him per $1,000 excluded would be the difference between the income tax that would have been levied against this $1,000 during each of the working years of his life and the income tax per $1,000 of taxable income during his retired years; or, if he should draw out the accumulated trust fund in one lump sum, the difference between the current income tax per $1,000 and the capital gains tax on $1,000.

The 1951 income tax rate schedule does not have a constant percentage increment. The starting rate is 20.4% on taxable income of not over $2,000, rising 2% for the next income group, $2,000 but not over $4,000; then it jumps 4.6 percentage points to 27% on taxable incomes between $4,000 and $6,000; in the next bracket in the scale it rises 3%, in the next, 5%, and then in the next bracket, 4%, etc. Thus the increment in the tax rate ranges from 2% to 5% on taxable incomes of $2,000 to $150,000. The advantage of tax deferment, except when capital gains are involved, is in paying a lower tax rate during the retired years as the annuity is received than would have been applicable during the working years of life. Future increases in tax rates could eliminate all gains from tax deferment; future decreases in rates would, of course, enlarge the gains. It should be carefully noted that the greatest prospective "one step" gain in the tax rate is for a person who would have paid the minimum rate of 20.4% on the excludable amounts during his working lifetime—if he had not excluded the amounts—and has exemptions that cover all of his income during his retired years. The value of his tax deferment to him, at current income tax rates, is 20.4%—equivalent to the increment of 4 to 10 tax brackets. From this point of view, the greatest tax savings percentagewise from tax deferment under this bill may actually be enjoyed by persons in the low income group.

PART 3: GENERAL REASONS

Until 1935 the problem of financing the retired years of life had been left largely to private initiative, although a few states had enacted pension laws. The Social Security Act of 1935 was a landmark. It embodied the notion of social responsibility for furnishing minimum income to our older citizens. That act, as amended, still provides only a floor of protection. Employers pay their half of the tax out of gross receipts and, accordingly, such sums are not subject to federal taxes. Employees pay their payroll tax after federal income taxes. The resulting O. A. S. I. pension is not subject to tax, not even the small portion that the employer financed by his contributions. The formula for determining the monthly benefit is weighted in favor of the low paid and older employees.

The second landmark was Section 165 of the 1942 Federal Internal Revenue Code. Under its provisions pension and profit sharing plans and trusts established by employers for the benefit of employees could be approved if they met certain requirements. And the current contributions of the employer are never taxable to the employer and not to the employee until he receives the benefits, usually during his retired years. The benefits under these plans are not limited to the low income group. The intention of Section 165 was to encourage a second layer of pensions and to generally meet some of the retirement needs of persons earning more than $3,000 or, since 1950, more than $3,600.

The first two steps have been taken by the Social Security Act of 1935 and Section 165 and related sections of the 1942 Internal Revenue Code. The bill, with the suggested changes, that we are discussing today is the third step to complete the changeover from a general social theory of leaving the financing of old age to private initiative to the new social theory of having the federal government encourage the individual to set aside some of his earned income for old age.

From the broad social and economic standpoint, why is this third step so necessary? I shall stress the needs of physicians, although most of what I say will apply with almost equal force to lawyers, dentists, and other professional persons. The very nature of professional work and training makes this discrimination against the self-employed professional man especially burdensome. The total lifetime income taxes paid by a physician on a lifetime income of a certain amount may greatly exceed those paid by a nonprofessional person on the same amount of lifetime income, because the physician has a long training period and his high earnings are "bunched" into a relatively small number of peak years. I am not talking about most of the physicians who are employed, because their employers are encouraged by Section 165 and related sections to establish pension systems. Their employers can set aside funds for pensions, which, as already noted, are deductible from company income as business expenses and are not even taxable income to the employee until he receives the benefits years later.

Consider the cost of becoming a physician. Typically, the doctor has spent three or four years in premedical training and four years in medical school. He was not an average student but was an above average student. There followed one year of internship at nominal rates of pay, and, for most, internship was

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followed by one or more years of residency training at nominal salary. Elsewhere I have estimated that the cost to the physician of his training on the first day he starts to practice is at least $35,000. Our tax laws do not permit him to depreciate this capital cost of becoming a physician, nor am I advocating any change of the tax laws in that direction. So the physician who enters practice at 28 to 30 years of age will not have the opportunity to depreciate his investment for tax purposes. The average physician will, of course, earn several times the average income of all wage earners.

As has been noted by others, the laws of many of our states prohibit the corporate practice of medicine, for it is contrary to the public interest. The professional man should be responsible for his acts. Since he cannot incorporate, he must practice as an individual proprietor, in a partnership, or (rarely) as an employee.

MEDICAL MOTION PICTURES

Anorectal Divulsion Versus Pectenotomy: 16 mm., color, silent, showing time 15 minutes. Prepared by Manuel G. Spiesman, M.D., Chicago Medical School, and Louis Malow, M.D., Mount Sinai Hospital, Chicago. Produced in 1951 by and procurable on purchase (apply for price) or loan from Mervin LaRue & Co., 159 E. Chicago Ave., Chicago 11.

The stated purpose of this film is to give a review of the etiology of fissure in ano and to describe a new approach to the surgical treatment of this condition. The film shows the origin and location of the pathological fibrous connective tissue band in the anal canal called the "pecten band," which gives rise to anal tightness and is commonly found in conditions like fissure in ano, cryptitis, papillitis, fistula, and pruritus ani.

The reviewers do not agree entirely with the authors' conception of this entity, because the story as brought out in the film is not complete from a teaching standpoint. The pecten band is pathological. Therefore a logical question should be raised as to the pathogenesis of this abnormal band of fibrous tissue. Could it not be another manifestation of anal infection? The surgical correction of the pecten band is nicely shown and is indeed preferable to the crude and surgically unsound practice of divulsion. The authors' technique includes destruction of additional anal crypts by means of excision. The suggestion is offered that, were all demonstrable anal crypts destroyed by means of multiple craniotomy (i. e. incision along a hook and excision of the margins of the resulting wounds), the subcutaneous band of fibrous tissue would be incised at several points, rather than posteriorly alone. This procedure insures ample room in the anal canal and is a prophylactic measure against further anal infection. The color photography is well done. The film will be of primary interest to general surgeons and will also be of interest to general practitioners, proctologists, and house officers. It is hoped that this film will stimulate productive discussion of the subject.

Ages and Stages Series: 16 mm., black and white or color, sound. Produced in 1951 for the Department of National Health and Welfare and the National Film Board of Canada by Crawley Films, Ltd., Ottawa. Procurable on purchase from McGraw Hill Book Co., 330 West 42nd Street, New York 18. For rental, consult local film libraries.

He Acts His Age: showing time 14 minutes (black and white $60, color $120). This film is an overview of a series being produced showing growth developmental stages of children from 1 to 15 years of age. It is an excellent introduction to the more detailed films to follow. It points out the fact that understanding what to expect of children at various ages is a prerequisite to helping in their emotional development. This film of children at play gives us authentic information.

The Terrible Twos and the Trusting Threes: showing time 22 minutes (black and white $80, color $160). This is the first film of the series that deals with specific age groups. A nursery school play yard and the home are the settings for this realistic, positive motion picture of the aggressiveness and uncoordinated activities of the "terrible twos" who, with patience and loving understanding, develop into the "trusting threes." The film is especially helpful in showing how distractions rather than punishment, affection and understanding rather than irritations, and constructive activity go to create a happy child. There is nothing threatening in this film. It shows that parents are human and can be irritated without being punitive. It cannot help but give them many stimulating ideas. It is down to earth and full of humor and practical suggestions, and its people are real.

The photography and narration are noteworthy. Obviously, great care has been taken in the selection of subjects and situations, and an unusually fine result is obtained. These are real scenes and actual countryside homes, where the children have been photographed in natural and expressive ways. Both of these films, and it is hoped those that follow, should be classics in the field of child guidance and parent education. They are recommended for all parent groups, nursery school teachers, persons in any field of medicine concerned with children, and for the training of teachers.

Tolserol (Mephenesin) in Rheumatic Diseases: 16 mm., color, sound, showing time 18 minutes. Richard T. Smith, M.D., Technical Adviser. Produced in 1951 by the DeFrenes Co., Philadelphia. Procurable on loan from E. R. Squibb & Sons, 745 Fifth Ave., New York 22.

This film is a report on a drug concerning which further investigations are in progress. Dr. Smith begins the presentation by explaining, with the aid of animation, the mechanism of action of mephenesin (tolserol®) in relation to rheumatic disorders and the muscle spasm-pain-muscle spasm cycle. Next he presents a pictorial report of the response to mephenesin of five rheumatic disease patients. The demonstrated conditions were selected from a published series of 200 patients treated in the department of rheumatology of the Benjamin Franklin Clinic, Pennsylvania Hospital, Philadelphia. Rheumatoid spondylitis, lumbago, fibrositis, acute stiff neck, and acute bursitis cases are shown. Each case is presented individually: first, the condition before the administration of mephenesin, and then the effect of the drug on the condition. Dr. Smith's commentary points out the dosages used with the various patients, the duration of action of the drug, and other medical points significant of the use of mephenesin in the treatment of the conditions presented in the film. The patients in the film were chosen to demonstrate the maximum benefit that can be expected. Certain other rheumatic conditions studied, he says, show less response to the drug, and he explains when and why.

This is a good demonstration of the action and the clinical application of the drug. It makes a proper division between its effectiveness in the treatment of acute and chronic conditions. The picture is well organized, and the photography, animation, and narration are excellent. It is recommended for general practitioners, interns, and residents.

Drug Addiction: 16 mm., black and white, sound, showing time 21 minutes. Produced in 1952 by Encyclopaedia Britannica Films, Inc., in cooperation with the Juvenile Protective Association of Chicago and the Wieboldt Foundation. Consultant: Andrew C. Ivy, M.D., University of Illinois. Procurable on purchase ($95) or rental from Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill. or on rental from local film libraries.

This film traces the case of a teen-age boy who has become addicted to the use of narcotics. It follows the events in his life including his first introduction by another boy to marijuana and to the local supplier, his becoming a diacetylmorphine (heroin) addict and peddler, his committal to a hospital, and the early days of his return from the hospital. Several episodes from his life during this period illustrate the unglamorous aspects of the addict's life, including the necessity of turning to crime to get enough money to pay the ever-increasing cost of narcotics. An explanation and description of the supply and distribution channels is also included.

The situations presented in this picture are those that actually exist in many communities, and the youngsters that are involved in drug addiction are reasonably normal adolescents who have been exposed through taking a dare rather than through the pressure of social conditions. There is no indication that drug addiction is an entertaining experience. The entire presentation

is in a manner suitable for the instruction of young persons and for helping their parents understand some of the problems these young persons face. Two important control measures and the treatment of addiction are brought out, though not sufficient emphasis is given to education even though the film is intended as an educational medium. The photography and narration are good. This is, generally, a satisfactory film for illustrating the problems of drug addiction among adolescents to parents, and it could also be used with selected high school groups. It might put ideas in the minds of adolescents, but if there is a question in their minds it might help them to resolve their problems. The film should not be shown without a suitable trained adult guidance and discussion leader.

BUREAU OF LEGAL MEDICINE AND LEGISLATION

MEDICOLEGAL ABSTRACTS

Evidence: Physician as Witness Against Osteopath.—The plaintiff sued for damages for the death of her husband alleged to have been caused by the negligence of the defendant osteopaths. From a judgment in favor of the defendants, the plaintiff appealed to the Supreme Court of Michigan.

Mr. Bryant entered a hospital and underwent a thyroidectomy, which was performed by one of the defendants at the direction of the other. He died the day after the operation. The plaintiff contended that it was the duty of the defendant to "attend plaintiff's decedent in a skillful and careful manner, to use those methods of examination, diagnosis, and surgery which are usually prescribed and used in the art and profession of osteopathic medicine and surgery . . . including basal metabolism laboratory tests, cardiograph and X-ray treatment before undertaking surgery upon the plaintiff's decedent's body, and to use proper care, attention, medication, and treatment prior to the surgical operation for the purpose of properly preparing the plaintiff's decedent for surgical operation so as to reduce the risks thereto involved." The defendant osteopath who performed the operation admitted the performance of the operation and his duty to attend the plaintiff's decedent in a careful and skillful manner and "to use the methods prescribed by the profession of osteopathy." He further averred that such duties were fully performed by him. He specifically denied that a basal metabolism test, cardiograph, or x-ray treatment were necessary to a proper diagnosis of the plaintiff's decedent's condition and alleged that "the usual care, attention, medication and treatment was given to plaintiff's decedent prior to the surgical operation."

The plaintiff's principal witness was a physician and surgeon duly licensed as such in the state of Michigan who was qualified as an expert in his field of practice. He testified to his experience in treating thyroid patients and was permitted to state, over the objection of counsel for defendants, what he considered to be the standard of practice involved in the management of such patients. The hospital record indicated that the treatment actually given Mr. Bryant was not in accord with the claim of the witness as to the standard practice, and the witness was permitted to express the opinion that the failure, in the instant case, to comply with the standards of practice detailed by him might or could have reduced the patient's chance of survival.

Defendant's objections to the testimony of this witness were based on the claim that the witness did not know the methods of treatment, care, and operation customarily followed by practitioners of osteopathy, or the degree of care and skill customarily employed by ordinary practitioners of such school in the community or similar communities. In this connection the witness testified that he was not familiar with osteopathic schools and that he had no knowledge as to their teachings, other than by hearsay. He had never attended any osteopathic clinics, or discussed with osteopathic physicians and surgeons the question as to what constitutes proper preoperative or postoperative care. He indicated also that he was not familiar with osteopathic literature and that he had no knowledge of the fundamental concepts of osteopathy or osteopathic viewpoints of symptomology.

It has been repeatedly held, said the Supreme Court, that the implied contract between a patient and surgeon requires the latter to use the degree of diligence and skill ordinarily exercised by the average of the members of the profession in the same locality or in similar localities, with due consideration to the state of the profession at the time. Thus it was the duty of the defendants to treat Mr. Bryant's ailment with due and proper care. Furthermore, the defendant in a malpractice action is entitled to the testimony of competent practitioners of his own school of medicine on the issue of whether he exercised the requisite degree of skill and care in such treatment. In other words, it was the duty of these defendants to use that degree of care and skill in their handling of the case and in the treatment given the patient customarily used by practitioners of osteopathy, and they were not held to the observance of standards of practice or methods of practice customarily used by practitioners belonging to other schools devoted to the cure, alleviation, and treatment of human ailments and diseases. Thus the alleged failure of the defendants to exercise the requisite degree of care and skill in the treatment of plaintiff's decedent could not be established other than by the testimony of an expert or experts familiar with the ordinary methods and standards of practice of osteopathic physicians in the community or in similar communities, and the plaintiff could not complain that the methods and standards of practice customarily observed by another school were not followed.

This rule, continued the court, does not, however, exclude the testimony of physicians of other schools or experts in other lines when that testimony bears on a point as to which the principles of the two schools concur, such as matters of diagnosis, the methods and dangers of the x-ray or other electrical or mechanical appliances in common use by the several schools, or the existence of a condition that should be recognized by any physician of any school. The plaintiff's claim is that the testimony of her principal witness should be held sufficient to establish that the methods and standards of practice of osteopathic practitioners, in a case of the character here involved, were the same as those of the school to which he belonged. However, a consideration of all the testimony of the witness in question leads to the conclusion that the claim made is not tenable.

Furthermore, continued the Supreme Court, we are not here concerned with the duty of a practitioner of any school for the treatment, cure, and alleviation of human ailments to exercise due and proper care in making a diagnosis. No claim is made that the defendants did not correctly diagnose the cause of the plaintiff's condition. The plaintiff's cause of action rests primarily on the theory that the defendants did not follow, in preparing the patient for the operation and in treating him thereafter, the methods customarily taught in osteopathic schools in their practice in the same community or in similar communities. Under the situation here presented plaintiff's claims could not be established other than by the testimony of an expert or experts possessing the requisite knowledge as to proper care and skill with reference to such matters according to the teachings of osteopathic schools and the methods customarily employed by osteopathic practitioners, as suggested by the applicable test. In view of the repeated statements that the plaintiff's witness had no knowledge of osteopathy or the methods and standards of practice generally of osteopathic practitioners, the conclusion necessarily follows that he was not competent to testify whether the defendants exercised due and proper care, according to the applicable test, in treating Mr. Bryant's ailment and in performing the operation. Obviously the standards of practice that the witness indicated should be followed in such a case were those of his own school and those which his own study and experience had persuaded him were correct. In giving his testimony he was not speaking from the standpoint of osteopathic schools or practitioners nor was he in a position to do so.

Accordingly, the Supreme Court held that the testimony of the plaintiff's principal witness was not competent for the purpose for which it was offered. The judgment in favor of the defendants were therefore affirmed. *Bryant v. Biggs et al., 49 N.W. (2d) 63 (Michigan, 1951).*

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MEDICAL LITERATURE ABSTRACTS

UNITED STATES

A.M.A. Arch. Surgery, Chicago

64:1-134 (Jan.) 1952

*Terramycin in Treatment of Peritonitis. E. Reiss, E. J. Pulaski, C. P. Artz and J. R. Shaeffer.—p. 5.

Lung Cancer: Angiocardiographic Findings in 100 Consecutive Proved Cases. I. Steinberg and C. T. Dotter.—p. 10.

*Parenteral Nutrition with Solution Containing 1,000 Calories per Liter. C. O. Rice, J. H. Strickler and P. S. Erwin.—p. 20.

Persistent or Recurrent Proximal Ileitis Following Surgery. R. Colp and D. A. Dreiling.—p. 28.

Corticotropin (ACTH) in Treatment of Keloids. H. Conway and R. B. Stark.—p. 47.

Simple Percutaneous Technique of Stable Nailing of Fractures of Neck of Femur. H. Gelbke.—p. 51.

Cross Circulation for Intracardiac Surgery. J. L. Southworth and E. C. Peirce II.—p. 58.

Histology of Goiter and Blood Iodine. V. E. Chesky, W. C. Dreese, B. O. Duboczky and C. A. Hellwig.—p. 64.

Aneurysm of Anomalous Pancreaticoduodenal Artery: Case Report and Review of Literature. J. W. Sampsel, F. M. Barry and H. D. Steele. —p. 74.

Shock Therapy with Intraperitoneal Infusion of Blood Volume Replenishers, Dextran and PVP. J. K. Narat, P. A. Casella and J. P. Cangelosi.—p. 80.

Carcinoid Tumors of Small Intestine: Report of Additional Case of Malignant Ileal Argentaffinoma with Frank Mucosal Ulceration in 32-Year-Old Woman. C. R. Bowers and J. H. Cheek.—p. 92.

Some Limitations of Lumbar Sympathectomy in Arteriosclerosis Obliterans: Early Results in 100 Consecutive Cases. R. G. Smith, M. Gullickson and D. A. Campbell.—p. 103.

Cervical Traction Frame. E. F. Schmerl.—p. 108.

Critique of Mushroom-Catheter Treatment of Acute Gastroduodenal Perforation. G. V. Eckhout.—p. 111.

Terramycin in Treatment of Peritonitis.—The histories of 68 patients with peritonitis are reviewed, 47 who were treated at Brooke Army Hospital and 21 at Tokyo Army Hospital. Among the patients at Brooke Army Hospital the peritonitis was of appendical origin in 28 and in the remaining 19 it arose from a variety of causes, including pelvic inflammatory disease, gangrene of the bowel, perforated peptic ulcer, gunshot or knife wounds of the abdomen, perforated carcinoma of the stomach or colon, and perforated sigmoid diverticulum. All but 3 of the 21 Tokyo patients had peritonitis secondary to gunshot wounds of the abdomen. Terramycin was given initially to 31 of the 47 patients at Brooke Army Hospital and to the other patients after penicillin and streptomycin, penicillin alone, aureomycin, and chloramphenicol had failed to bring the disease process under control. When terramycin was used initially, it was given within 24 to 48 hours after the onset of the disease. The patients treated at the Tokyo Army Hospital, however, did not arrive at that hospital for an average of eight days after injury. Emergency surgery, including suture of the small bowel and colostomy, was performed in the forward areas, where the penicillin and streptomycin were given routinely in combination. The uniform dosage regimen for treatment with terramycin consisted of 1 gm. of terramycin intravenously every 12 hours for 2 to 4 days and then, as soon as oral medication could be tolerated, 0.5 gm. by mouth every 6 hours for 8 to 10 days. The largest number of excellent responses was achieved in the patients with spreading peritonitis. The incidence of such dramatic results declined in the less virulent infections (localizing and localized). Of the 32 patients with spreading peritonitis, results were excellent in 17, good in 8, doubtful in 1, and poor in 6. Four of the five patients with spreading appendical peritonitis with excellent responses did not require surgical intervention. Two deaths occurred, and one of these could be explained on the basis of concomitant disease rather than of antibiotic failure. In four patients the disease process failed to respond to adequate trials of intravenous terramycin therapy, but recovery followed administration of an alternate antibiotic.

Parenteral Nutrition.—One of the major problems in parenteral nutrition has been the provision of adequate calories without overhydration. Rice and associates discuss their experience with a parenteral solution that contains 1,000 calories per 1,000 cc. This approaches the physiologically normal proportion of calories to fluid, in that 2,500 calories and 2,500 cc. of fluid represent nearly the average daily requirement for the normal person. Commercial solutions of concentrated invert sugar and amino acids were used to prepare this solution. Invert sugar is an acid hydrolysate of cane sugar, yielding equal parts of glucose and fructose. Absolute ethyl alcohol was added to increase the caloric content. One liter of the solution contains 120 gm. (480 calories) of invert sugar, 60 gm. (240 calories) of amino acids, and 40 gm. (50 cc. and 280 calories) of ethanol. The authors use this solution in the postoperative period until the patient is able to consume adequate food or whenever a patient is in need of fluid or calories. Parenteral nutrition with this solution simplifies the calculation of the nutritional intake, because each cubic centimeter represents one calorie. A total of 543 liters of this solution was administered intravenously to 109 patients. The local reaction in the vein was not greater than when 5% glucose was given intravenously. A polyethylene tube was used to give greater comfort for the patient. Extravasation of the solution produced local redness and soreness but no slough. Continuous administration of this solution provided the full nutritional requirement without overhydration. Patients receiving this solution had a smooth convalescence. There was neither polyuria nor oliguria during the infusion, and the blood sugar level did not exceed the renal threshold. In two cases of biliary fistula this form of feeding seemed to diminish the secretion of bile and allow the irritated fistulous tract to heal. The method also offers a substitute for gastrostomy in patients who undergo resections of the mandible for carcinoma, and it is suitable also for patients who must be nourished through a gastrostomy. Adequate parenteral nutrition in the immediate postoperative period seems to aid the maintenance of a normal electrolyte level of the blood.

American Review of Tuberculosis, New York

65:111-220 (Feb.) 1952

Tuberculosis Attack and Death Rates of Household Associates: Influence of Age, Sex, Race, and Relationship. R. R. Puffer, L. D. Zeidberg, A. Dillon and others.—p. 111.

Disseminated Nodular Pulmonary Infiltrations of Indeterminate Nature in Apparently Healthy Persons. A. D. Chaves and H. Abeles.—p. 128.

Diffuse Pulmonary Granulomatosis in Young Women Following Exposure to Beryllium Compounds in Manufacture of Radio Tubes: Further Observations and Report of Nine Additional Cases. P. Slavin. —p. 142.

Simultaneous Pulmonary Resection and Thoracoplasty in Treatment of Pulmonary Tuberculosis. F. H. Ellis Jr., O. T. Clagett and D. T. Carr.—p. 159.

Prognosis of Tuberculous Meningitis. R. Debré.—p. 168.

Growth Pattern and Virulence of Tubercle Bacilli. D. Yegian and J. Kurung.—p. 181.

Use of Oxidation-Reduction Dyes in Determination of Virulence of Mycobacteria in Vitro. F. J. Wilson, C. Kalish and C. H. Fish.—p. 187.

Comparative Study of Hemagglutination Test for Antibodies and Its Hemolytic Modification in Tuberculosis. M. Mollov and T. J. Kott. —p. 194.

Effects of Simultaneous Skin Tests on Size of Tuberculin Reactions. C. Crumb, P. Meier and F. B. Seibert.—p. 201.

Periodicals on file in the Library of the American Medical Association may be borrowed by members of the Association or its student organization and by individual subscribers, provided they reside in continental United States or Canada. Requests for periodicals should be addressed "Library, American Medical Association." Periodical files cover only the last 11 years, and no photoduplication services are available. No charge is made to members, but the fee for other borrowers is 15 cents in stamps for each item. Only three periodicals may be borrowed at one time, and they must not be kept longer than five days. Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

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Annals of Internal Medicine, Lancaster, Pa.

36:1-278 (Jan.) 1952

Reversibility of Certain Rheumatic and Nonrheumatic Conditions by Use of Cortisone or of Pituitary Adrenocorticotropic Hormone. P. S. Hench.—p. 1.
Role of Elastic Tissue in Formation of Arteriosclerotic Lesion. A. I. Lansing.—p. 39.
Phosphate Ester Poisoning, New Problem for the Internist. D. O. Hamblin and J. F. Marchand.—p. 50.
*Bacteroides Infections. L. V. McVay Jr. and D. H. Sprunt.—p. 56.
Therapy of Gonococcal Arthritis. P. O. Hagemann, A. Hendin, H. H. Lurie and M. Stein.—p. 77.
*Carcinoma of Body and Tail of Pancreas: Report of 37 Cases Studied at the State of Wisconsin General Hospital from 1925-1950. B. K. Smith and E. C. Albright.—p. 90.
Peptic Ulcer: Medical Cure by Efficient Gastric Acid Neutralization. N. E. Rossett, F. H. Knox Jr. and S. L. Stephenson Jr.—p. 98.
Recognition and Treatment of Hepatic Amebiasis. D. C. Zavala and H. E. Hamilton.—p. 110.
Myocardial Lesions in Subacute Bacterial Endocarditis. E. L. Perry, R. G. Fleming and J. E. Edwards.—p. 126.
Screening for Chest Pathology Using Mass X-Ray Survey Technic. G. H. Gowen and B. Frank.—p. 138.
Sinus Bradycardia in Acute Rheumatic Fever. J. G. Hirsch and D. M. Flett.—p. 146.
Old Age in the Bible and Poetry. L. A. M. Krause.—p. 152.

Bacteroides Infections.—During the past five years the authors have observed 35 patients between the ages of 7 months and 71 years with bacteroides infections. The portal of entry was the respiratory system in 6 patients, the gastrointestinal tract in 6, the female genital tract in 13, the urinary system in 7, the skin in 1, and the ear in 2. Twenty-one of these patients were critically ill and 11 died. Bacteroides organisms were the primary cause of death in nine, and were secondary invaders in the two other patients, who died of malignancy. Necropsies were performed on nine patients. During life most of the patients did not appear seriously ill. Patients who had temperatures as high as 106 F, with a marked leukocytosis, frequently presented minimal symptoms. The usual clinical picture was that of a pyogenic infection, with the dominating symptoms being determined by the portal of entry. The characteristic pathological lesion was localized suppuration similar to that caused by staphylococci, which occasionally invaded the blood stream, with subsequent bacteremia or septicemia and metastatic abscess formation. When the latter occurred, the patient became critically ill and the prognosis grave. In 22 cases Bacteroides were obtained in pure culture from blood, purulent material, urine, and cerebrospinal fluid; in 10 instances these organisms were associated with one to three other bacteria, and in 3 cases Bacteroides were obtained alone on one occasion but associated with another organism at another period. In view of the prolonged, debilitating, and often fatal outcome of many Bacteroides infections, early diagnosis and appropriate treatment are essential. In vitro and in vivo studies indicated that aureomycin may be the therapeutic agent of choice in these infections. When the oral route of administration cannot be utilized, aureomycin should be given intravenously. The importance of Bacteroides infections has been grossly underestimated. Improved laboratory facilities and a greater awareness on the part of physicians should lead to increasing recognition of the importance of Bacteroides infections in man.

Carcinoma of Body and Tail of the Pancreas.—Thirty-seven cases of carcinoma of the body and tail of the pancreas were studied in order to formulate a combination of signs and symptoms that may permit an early diagnosis. Of the 37 patients, 31 were men and 6 were women. The average age of the patients was 58.1 years. The average duration of the disease in the 24 patients followed to necropsy was 9.1 months. The correct diagnosis was made in only seven patients before laparotomy or autopsy, the common incorrect diagnosis being carcinoma of the colon. The commonest symptoms were abdominal pain, weight loss, anemia, nausea, vomiting, and constipation. Multiple venous thrombi were noted in eight patients, the femoral and iliac veins being commonly affected. Abdominal pain aggravated by the supine position and relieved by erect position were noted in 15 patients. Ascites was present in 12 patients, and in all of them liver metastases combined with peritoneal implants or portal vein thromboses were revealed by necropsy or laparotomy. Barium studies of the gastrointestinal tract revealed no abnormalities in the majority of cases. Because of the apparent difficulty of early diagnosis, early search for venous thrombi and thorough blood studies in regard to amylase, prothrombin, and clotting factors are urged. The combination of weight loss, anemia, constipation, venous thrombosis, and otherwise unexplained abdominal pain aggravated by the supine position should suggest immediately the possibility of carcinoma of the body of the pancreas.

Annals Otol., Rhin. and Laryngology, St. Louis

60:897-1196 (Dec.) 1951. **Partial Index**

Allergic Factor in Chronic Bronchopulmonary Infections. F. W. Davison.—p. 948.
Fish Bones in Esophagus. J. L. Goldman.—p. 957.
Formation of Otoliths. T. Vilstrup.—p. 974.
Lipoma of Larnyx. F. Harbert.—p. 982.
Adenoma of Ceruminous Glands. W. H. Brannon and G. E. Fisher.—p. 986.
Endonasal Schwannoma. M. Gonzalez Loza and E. Rosenzvit.—p. 988.
Hearing Aids: How They Work and for Whom. I. J. Hirsh.—p. 1032.
The Deaf and Hard of Hearing Child. C. O'Connor.—p. 1039.
Psychogenic Deafness and Its Detection. L. G. Doerfler.—p. 1045.
Anti Allergic Methods Used in Restoration of Hearing During Childhood. M. F. Jones, G. A. Sisson, R. J. Bellucci and F. C. Edmonds Jr.—p. 1085.
Effect of Cholesteatosis on Bone. T. E. Walsh, W. P. Covell and J. H. Ogura.—p. 1100.
Extra-Temporal Repair of Facial Nerve: Case Reports. J. H. Maxwell.—p. 1114.
Postural Vertigo and Positional Nystagmus. J. R. Lindsay.—p. 1134.
*Long-Term Results of Fenestration Surgery. H. P. House.—p. 1153.

Long-Term Results of Fenestration.—Complete records, including questionnaires and audiograms, were available for only 88 of 200 patients five or more years after they were subjected to the fenestration operation. Nearly two-thirds of these patients were pleased with the hearing result five years after the operation. All patients prior to the fenestration operation had lost serviceable hearing and should have been wearing a hearing aid. Five years after fenestration, 27% of the patients were wearing a hearing aid and an additional 17% stated that they felt the need of a hearing aid, a total of 44%. Conversely, 56% of the patients have satisfactory hearing without a hearing aid five years after fenestration.

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Arizona Medicine, Phoenix

9:1-80 (Jan.) 1952

Surgical Treatment of Carcinoma of Colon and Rectum. J. Van Prohaska and M. C. Govostis.—p. 21.
Treatment of Sk... Cancer. K. C. Sawyer and A. R. Woodburne.—p. 26.
Sporotrichosis (Report of Case). K. C. Baker and J. T. Malone.—p. 28.
What to Know About Modern Chest Surgery. R. M. Janes.—p. 29.

9:1-76 (Feb.) 1952

Anesthesiology and Its Practical Adaptation into General Medicine and Surgery. E. B. Tuohy.—p. 19.
Diagnosis and Treatment of Small Bowel Obstruction. M. W. Merrill.—p. 25.
Industrial Urology. P. L. Singer.—p. 31.

Diabetes, New York

1:1-86 (Jan.-Feb.) 1952

Salute to Diabetes. E. P. Joslin.—p. 1.
Endocrine Control of Blood Sugar. C. N. H. Long.—p. 3.
Proper Use of Laboratory Tests in Diagnosis and Management of Diabetes. F. D. W. Lukens.—p. 12.
Hyperglycemia in Coronary Thrombosis. M. Ellenberg, K. E. Osserman and H. Pollack.—p. 16.
Dermal Reactions to Insulin Therapy. R. G. Paley and R. E. Tunbridge.—p. 22.
Serum and Urinary Proteins in Diabetic Glomerulosclerosis: Results of Electrophoretic Analysis. H. Rifkin and M. L. Petermann.—p. 28.
Controlled Versus Free Diet Management of Diabetes. J. L. Wilson, H. F. Root and A. Marble.—p. 33.
*Pituitary Necrosis in Diabetic During Pregnancy: Houssay Phenomenon in Man. F. W. Williams.—p. 37.

Houssay Phenomenon in Man.—The occurrence of pituitary necrosis is reported in a diabetic woman, aged 27, in the third month of pregnancy. Prior to her admission to the hospital the patient had repeated episodes of hypoglycemia despite reduction of the daily insulin dosage from 60 to 15 units. On admission to the hospital she was unconscious and must have been in this

state for 12 hours. After the rapid, intravenous administration of 3,400 cc. of dextrose, her urine had become sugar-free, but two hours later it contained sugar (4+) and a trace of acetone. She then was given 10 units of regular insulin with an infusion of dextrose, and in response to this treatment the urine again became sugar and acetone-free. Because of the repeated hypoglycemia before admission, the need for huge doses of dextrose intravenously in the hospital, and the sharp response to 10 units of regular insulin, the possibility of loss of pituitary function was considered when the patient died 37 hours after admission, without regaining consciousness. At necropsy the pituitary was twice the normal size, and a large part of the gland had been destroyed by hemorrhage. Pituitary necrosis had resulted in intractable hypoglycemia with extreme sensitivity to insulin, and finally in death. The condition can be compared to the situation produced experimentally by the animal experiments of Houssay, in which he removed both the pancreas and the pituitary. The evidence presented in the author's case appears to justify the conclusion that it represents one of the few recorded examples of the Houssay phenomenon in man.

Endocrinology, Springfield, Ill.

50:1-142 (Jan.) 1952. **Partial Index**

Comparative Value of Cortisone, 17-Hydroxycorticosterone and Adrenal Cortex Extract Given by Continuous Intravenous Injection in Sustaining Ability of Adrenalectomized Rat to Work. D. J. Ingle, J. E. Nezamis and E. H. Morley.—p. 1.

Demonstration of Non-Estrogenic Uterine Stimulating and Estrogen Augmenting Substance in Pregnant Mares' Urine. H. Cohen and R. W. Bates.—p. 5.

Relation of Some Steroid Hormones to Beta-Glucuronidase Activity. E. Knobil.—p. 16.

Effect of a-Estradiol, Some of Its Esters and Estrone on Respiration of Tissue Homogenates. M. A. Guidry, A. Segaloff and A. M. Altschul. —p. 29.

Changes in Adenosine Triphosphate and Creatine Phosphate Content of Rabbit Uterus Throughout Sexual Maturation and After Ovulation. J. H. Menkes and A. Csapo.—p. 37.

Influence of Cortisone on Renal Function and Electrolyte Excretion in Adrenalectomized Dog. K. E. Roberts and R. F. Pitts.—p. 51.

Intravaginal Assay of Estrogens. F. G. Sulman.—p. 61.

Effect of Epinephrine and Thyrotropin on Thyroid Function in Rats. A. L. Botkin and H. Jensen.—p. 68.

Some Studies on Oxidative Metabolism of Adrenal Gland. T. L. Sourkes and P. Heneage.—p. 73.

Reciprocal Relation Between Hypophysis and Adrenals in Fetal Rats: Effects of Unilateral Adrenalectomy and of Implanted Cortisone, DOCA and Sex Hormones. R. L. Kitchell and L. J. Wells.—p. 83.

Diabetogenic Effect of Growth Hormone in Intact Force-Fed Adrenocorticotrophin Treated Rat. F. L. Engel, A. Viau, W. Coggins and W. S. Lynn Jr.—p. 100.

Myxedema in Radiothyroidectomized Dog. R. C. Goldberg and I. L. Chaikoff.—p. 115.

I^{131} Distribution in Normal and Hemithyroidectomized Rats Treated with Desoxycorticosterone Acetate. J. B. Boatman, C. Russ, J. H. Sunder and others.—p. 134.

Geriatrics, Minneapolis

7:1-86 (Jan.-Feb.) 1952

Operative Treatment of Degenerative Arthritis of Hip. F. C. Reynolds and J. A. Key.—p. 1.

Use of Digitalis in the Aged. M. J. Raisbeck.—p. 12.

Hypothyroidism: Geriatric Problem. S. T. Kimble and E. J. Stieglitz. —p. 20.

Scope of Cytology in Cancer Diagnosis. J. F. Seybolt.—p. 32.

Dietary Cholesterol and Atherosclerosis. E. Tuttle.—p. 37.

Atypical Systemic Amyloidosis Associated with Senile Gangrene. R. Love. —p. 42.

Clinical Evaluation of Psychiatric Disorders in the Aged. L. Tilkin. —p. 56.

Report on Current Trends in Arteriosclerosis Research. O. J. Pollak. —p. 59.

GP (J. Am. Acad. Gen. Practice), Kansas City, Mo.

5:1-222 (Feb.) 1952

How to Diagnose and Treat Gout. L. M. C. Kelly.—p. 34.

Psychiatric Method in General Practice. S. Wolf.—p. 43.

Facial Injuries. D. L. Murphy, E. S. Murphy and W. A. McNichols. —p. 47.

The Pneumonias. H. F. Dowling.—p. 53.

Breast Tumors. S. Leo.—p. 61.

The Antibiotics—Uses and Abuses. P. S. Rhoads.—p. 66.

International Journal of Leprosy, New Orleans

19:395-530 (Oct.-Dec.) 1951

Clinical and Laboratory Study of Leprosy in Liberia. H. A. Poindexter. —p. 395.

Leprosy in New Caledonia and Its Dependencies. E. Ragusin.—p. 413.

Treatment of Leprosy with Propiosulfone. G. Herrera.—p. 423.

*Treatment of Leprosy with Conteben. E. Keil.—p. 437.

Studies on Serum Proteins in Leprosy: Alpha, Beta and Gamma Globulin Fractions. Sister Hilary Ross and F. Gemar.—p. 445.

Amithiozone in Leprosy.—Keil points out that the almost identical morphological and staining properties of tubercle and leprosy bacilli suggest a close biological relationship of these acid-fast micro-organisms. The diseases caused by these organisms also have certain factors in common, and so it seems logical that drugs that have proved of value in one may also be effective in the other disease. This reasoning led investigators in several countries to try amithiozone (conteben®) in leprosy after this drug had proved of value in the treatment of tuberculosis. It appears that small doses of amithiozone are most effective at the beginning of treatment. An initial dose of 25 to 50 mg. per day has been recommended. The daily dose is then raised to 100 mg. or a maximum of 150 mg., according to the form and stage of the disease and the tolerance of the patient. A daily dose of 150 mg. should not be exceeded, even with good tolerance. The disadvantages of overdosage are more serious than those of inadequate dosage. The impression was gained that the favorable effects of amithiozone appear more rapidly than those of the sulfones and that this agent is tolerated better.

Journal of Bone and Joint Surgery, Boston

34A:1-248 (Jan.) 1952. **Partial Index**

*Local Stimulation of Growth of Long Bones: Preliminary Report. C. N. Pease.—p. 1.

Legg-Perthes Disease: Evaluation of Treatment by Traction and Ischial Weight-Bearing Brace. C. H. Herndon and C. H. Heyman.—p. 25.

Prophylaxis of Scoliosis. A. M. Arkin.—p. 47.

Fascial Arthroplasty of Knee. A. Miller and B. Friedman.—p. 55.

Arthrodesis of Wrist: Preliminary Report of New Method. R. F. Robinson and D. O. Kayfetz.—p. 64.

*Osteomyelitis in Infants. D. W. Blanche.—p. 71.

Intramedullary Fixation of Tibia. F. vom Saal.—p. 86.

Fractures Involving Distal Femoral Epiphyseal Cartilage. A. P. Aitken and H. L. Magill.—p. 96.

Reduction of Anterior Dislocations of Shoulder by Means of Milch Abduction Technique. T. Lacey II and H. B. Crawford.—p. 108.

Senescent Human Vertebra: Contribution to Human Osteogeny. III. E. M. Bick and J. W. Copel.—p. 110.

Orthograms of Posture. C. W. Goff.—p. 115.

Arthrodesis of First Metatarsophalangeal Joint for Hallux Valgus, Hallux Rigidus, and Metatarsus Primus Varus. D. C. McKeever.—p. 129.

Unusual Form of Osteo-Arthropathy Present Bilaterally in Knees of Two Brothers. J. D. Rogers and W. H. Bickel.—p. 135.

Osteochondritis Dissecans with Spontaneous Healing. R. E. Van Demark. —p. 143.

Scoliosis Complicated by Paraplegia. S. Kleinberg and A. Kaplan. —p. 162.

End-Result Study of Various Operative Procedures for Correcting Flat Feet in Children. C. H. Crego Jr. and L. T. Ford.—p. 183.

Transplantation of Semitendinosus for Repair of Laceration of Medial Collateral Ligament of Knee. D. M. Bosworth.—p. 196.

Local Stimulation of Growth of Long Bones.—Differences in limb length in children have been treated by arrest of growth of the longer bone or stimulation of growth in the shorter. Pease describes his technique for local stimulation of bone growth by insertion of ivory screws near the epiphyseal cartilage. Daily for one month prior to the operation, a teaspoonful to a tablespoonful of phosphorized cod liver oil is given to the child, the dosage depending upon the age. Ivory screws or pieces of ivory are sterilized by being placed in 95% alcohol and autoclaved under 15 lb. (6.8 kg.) of pressure for one hour. After a lateral longitudinal incision has been made at the end of the bone, just enough of the periosteum is stripped to permit drilling the holes. Although the incision is made in the epiphyseal plate region, it is not only unnecessary to expose the cartilage but it is recommended that the plate be avoided. Not one complication has arisen from this approach, but too much trauma at the site of the epiphyseal plate may arrest growth. The drill should be at least 1/64 in. (0.25 cm.) smaller than the screw. After the depth of the drill hole has been determined, a mark is made on the proximal portion of the screw to indicate how far the screw must be driven into the bone in order that its

distal end will extend just through the opposite cortex. The remaining proximal portion of the screw is then cut off flush with the cortex. Seven patients on whom this operation was performed have been followed for 6 months to 12 years. In five the growth retardation of the bone was due to poliomyelitis, in one to congenital hypoplasia, and in one to a congenital dislocation of the hip, with associated hypoplasia of the femur. A secondary operation was performed in two cases five and three years after the initial procedure. Stimulation of growth followed operation in all cases. No severe deformities occurred, but if they had, an osteotomy would afford additional length and at the same time produce further stimulation of longitudinal growth. Acceleration of bone growth occurred in four patients with poliomyelitis three, four, five, and six years after onset of the disease, coincident with growth-stimulating procedures. This suggests that the cells in the cartilage columns of the epiphyseal plates have not undergone degenerative changes during these periods. Much remains to be learned about bone growth in children. From the conflicting reports on the results of growth stimulation in animals, it is obvious that animal experimentation is not a reliable tool for study of growth stimulation of long bones.

Osteomyelitis in Infants.—The highest incidence of acute hematogenous osteomyelitis was formerly in the 10-year-old age group, but the peak incidence in recent years has been in infants less than one year old. Blanche reviews observations on 25 children less than 1 year old who were treated for hematogenous osteomyelitis diagnosed bacteriologically. Twenty-three were under 2 months of age on admission. The outstanding local symptoms were swelling and loss of function of an extremity. In 13 cases a single bone was involved. The total number of bone foci was 50; 22 were in the femur, and 16 at the proximal end, with associated pyarthrosis of the hip in 11 cases. Seven were in the humerus, mostly in the proximal end, and five were in the tibia. The infecting organism was isolated either from the local lesion, from blood culture, or from both; staphylococcus was isolated in pure culture in 21 cases. The 17 patients treated since 1944 received penicillin and 3 of the 8 treated previous to that time were given sulfonamides. There was complete recovery except for slight bone thickening in 10 patients. In eight cases there was major deformity of a crippling nature resulting from destruction of the epiphyseal plate, or of the epiphysis with disruption of the joint. The hip joint became septic in 11 of the 16 cases in which the proximal portion of the femur was involved. These patients were all treated by simple surgical drainage, usually followed by traction or application of a cast. The authors stress that the correct diagnosis of acute hematogenous osteomyelitis is often made late, after joint components and growth centers have been irreparably damaged. Normal temperature and absence of general reaction to infection may be misleading. This disease should be suspected if an infant becomes irritable and if swelling, tenderness, or loss of function of an extremity develop. The intra-articular tension and lytic action of pyogenic exudate in pyarthrosis of the hip rapidly destroy cartilage, thus causing disruption of the joint, dislocation, and growth disturbances. In dislocated hips that were observed later at open operation it was found that internal rotation was necessary to place the remaining elements of the proximal end of the femur into the acetabulum. The chief fault in present day treatment is delay of surgical drainage of localized abscesses, particularly when a hip joint is involved.

Journal of Neurophysiology, Springfield, Ill.

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Cortical Response to Stimulation of Lateral Geniculate Body and Potentiation Thereof by Continuous Illumination of Retina. Hsiang-Tung Chang.—p. 5.
Cerebro-Cerebellar Relationships in Monkey. R. S. Snider and E. Eldred.—p. 27.
Does Injury to Axon Promptly Induce Altered Excitability in Its Cell of Origin? B. Renshaw and H. E. Rosenbaum.—p. 41.
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Clinical Significance of Minor Inequalities in Leg Length. I. Redler.—p. 308.
Cortisone and ACTH in Dermatologic States. C. B. Kennedy, V. M. Henington, H. C. Cope and W. H. Hamilton.—p. 312.
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Ohio State Medical Journal, Columbus

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Pediatrics, Springfield, Ill.

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Familial Parosyxmal Choreoathetosis of Mount and Reback: Study of Second Family in Which This Condition Is Found in Association with Epilepsy. C. V. Pryles, S. Livingston and F. R. Ford.—p. 44.
Congenital and Infantile Aphasia: Review of Literature and Report of Case. D. W. Van Gelder, L. Kennedy and J. Laguaite.—p. 48.
Gynecomastia with Pigmentation in a Four Year Old Male Following Stilbestrol Exposure. M. Prouty.—p. 55.
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Unilateral Paralysis of Diaphragm in the Newborn Infant Due to Phrenic Nerve Injury, With and Without Associated Brachial Palsy. N. Schifrin.—p. 69.
Pre- and Postoperative Growth Patterns in Congenital Heart Disease as Shown by Wetzel Grid. M. R. Richards.—p. 77.
Nutritional Quality of Milk Thermally Modified to Reduce Allergic Reaction. R. M. Tomarelli, E. Linden and F. W. Bernhart.—p. 89.
Congenital Dislocation of Hip. L. G. Pray.—p. 94.
Pseudomonas Meningitis in Infant Successfully Treated with Neomycin. S. Ditkowdky, A. Goldman and M. Goldin.—p. 101.

Adrenocorticotropic Hormone in Retrolental Fibroplasia.—All infants entering the premature unit of Bellevue Hospital with retrolental fibroplasia were divided into a corticotropin-treated group and a control group by random selection. Five infants were treated with corticotropin and four were not. Corticotropin therapy was begun between the 7th and 37th day of life, and was given for from 30 to 66 days. The usual daily dose ranged from 20 to 40 mg.; lower dosages were given in three cases during a part of the therapeutic period. The total amount received ranged from 650 to 1,835 mg. These doses were sufficient to cause physiological changes, including a rise in the urinary formaldehydogenic steroid output; reduction of the circulating eosinophils, usually to zero; cutaneous pigmentation; rounding of the face; transient and usually minimal edema; and in the three patients in whom observations were made, hyperglycemia and glycosuria. One of the five infants treated died during therapy. Each of the four surviving infants developed extensive scar tissue behind the lens. This uniformity of therapeutic failure indicates that corticotropin as employed in this study is not an effective therapeutic agent in retrolental fibroplasia. The hazards of corticotropin treatment are evident in the side-effects noted in each case and emphasized by the death of one infant.

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Pennsylvania Medical Journal, Harrisburg

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79:1-198 (Jan.) 1952. **Partial Index**

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Effect of Anti-Rheumatic Drugs on Synovial Membrane Permeability. W. D. Paul, R. E. Hodges, R. W. Knouse and C. S. Wright Jr.—p. 68.
Mechanism of Hypotensive Action of Veratrum Alkaloids. A. P. Richardson, H. A. Walker, C. B. Farrar and others.—p. 79.
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Saphenous Circulation Time Test with Radioactive Tracer. H. T. Zankel and R. Clark.—p. 135.
Antifungal Properties of Polymyxins. H. J. Florestano and M. E. Bahler. —p. 141.
*Production of Positive Antiglobulin Serum Test in Rabbits by Intraperitoneal Injection of Homologous Blood. Chi Kong Liu and R. S. Evans.—p. 194.

Positive Antiglobulin Serum Test.—Studies of acquired hemolytic anemia indicate that the red cell sensitizing agent is a fraction of plasma protein similar in many ways to isoantibodies, but it is not known what conditions are necessary for its production. Since it appears to be an antibody specific for human red cells, attempts to produce the disease experimentally should include attempts to sensitize the animal to an antigen in autologous red cells. During a study of a patient with anemia secondary to intraperitoneal bleeding from a ruptured ectopic pregnancy, a transient positive antiglobulin test was observed. An effort was made to simulate this occurrence in animal experiments. Three of 12 rabbits receiving repeated intraperitoneal injections of their own blood immediately after removal from the heart developed a transiently positive antiglobulin serum test (Coombs' test) with a reagent made by injecting rabbit serum into guinea pigs. The authors suggest the relatively bland treatment of the red cells may have modified their surface structure sufficiently to provoke antibody production. None of the three developed evidence of a hemolytic anemia. Rabbits receiving injections of rabbit red cell stroma that had been incubated with bacterial filtrate or emulsions of rabbit liver or kidney failed to develop positive agglutination tests with the same reagent.

Surgery, St. Louis

31:1-166 (Jan.) 1952

Diseases of Superior Vena Caval System with Special Consideration of Pathology and Diagnosis. J. R. Veal and N. J. Cotsonas Jr.—p. 1.
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*Silicone-Tube Coagulation Time as Aid in Diagnosis of Phlebothrombosis. R. S. McCleery, J. A. Yarborough and M. G. Weidner Jr.—p. 28.
*Spontaneous Thrombophlebitis. P. T. DeCamp, R. M. Landry, A. Ochsner and M. E. DeBakey.—p. 43.
Effect of Venous Occlusion on Arterial Blood Flow in Extremities: Experimental Study. J. E. Thompson and J. R. Vane.—p. 55.
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Regional Heparinization After Thromboendarterectomy in Treatment of Obliterative Arterial Disease: Preliminary Report Based on 12 Cases. N. E. Freeman and R. S. Gilfillan.—p. 115.
Transmetatarsal Amputation in Arterial Deficiency of Lower Extremity. R. Warren, E. S. Crawford, I. B. Hardy and J. B. McKittrick.—p. 132.
Growth of Preserved Aorta Homografts: Experimental Study. J. Johnson, C. K. Kirby and R. C. Horn.—p. 141.
Experimental Cardiac Surgery: III. Coronary Blood Flow as Measured Directly with Caval Venous Return Shunted Past the Right Heart. F. B. Maraist and W. W. L. Glenn.—p. 146.
Maintenance of Life by Homologous Lungs and Mechanical Circulation. W. J. Potts, W. L. Riker, R. DeBord and C. E. Andrews.—p. 161.

Silicone-Tube Coagulation Time in Phlebothrombosis.—Discussing the difficulties encountered in finding an objective test that would accurately differentiate patients who are likely to develop phlebothrombosis following surgical procedures, McCleery and his associates point out that, if the unphysiological effect of glass on the blood coagulation time could be minimized, then a simple coagulation time method might have merit. Ideally, one should use glass test tubes lined with a nontraumatized vein wall. It has been shown that this goal can be partially approached by coating glass test tubes with silicone solutions. Two and one-half years ago the authors began preoperative and daily postoperative coagulation time determinations with silicone-coated tubes. They selected 273 patients likely to develop phlebothrombosis. Fibrinogen B, prothrombin time, Lee-White coagulation time, and blood viscosity were also determined daily on many of these patients. Eighteen of these patients developed evidence of phlebothrombosis while under observation. All of these had coagulation times below 45 minutes, whereas none of the other 255 patients had any postoperative clotting time that low. Other postoperative patients not in the group were spot-checked if they developed questionable signs. Patients having a positive test were given treatment. That the false positive rate must have been extremely low is substantiated by an incidence of only 0.7% phlebothrombosis in the 4,836 patients operated upon during the period of this study. An intensive follow-up study of over 90% of 290 patients with negative test results failed to reveal a single false negative result. Of all the tests performed, only the silicone-tube coagulation time seemed to be significant. Although the latter had no prognostic value, it did appear to have real merit in the clinical diagnosis of early cases of phlebothrombosis and pulmonary embolism.

Spontaneous Thrombophlebitis.—Venous thrombosis is commonly considered merely as a complication of other disorders. This paper, however, presents observations on 90 apparently healthy individuals in whom thrombophlebitis occurred without being preceded by infection, trauma, heart failure, cancer, operation, or other precipitating episodes. These cases were observed at two New Orleans hospitals over periods of 10 and 12 years, respectively. At one of these institutions the cases of spontaneous thrombophlebitis represented 4.5% of the entire series of 1,223 cases of acute venous thrombosis or pulmonary embolism. The clinical picture of spontaneous thrombophlebitis closely resembles similar types of phlebitis occurring secondary to some other condition. In spontaneous cases there is a relatively high incidence of involvement of the right lower extremity, of superficial phlebitis, and of recurrence. Thromboembolic disease of the venous system is protean in its manifestations, but the clinical picture is similar whether the disease occurs as a primary phenomenon or following some traumatic episode. For this reason, it should be considered as a disease entity and not merely as a complicating feature of other disorders.

FOREIGN

Acta Path. et Microbiol. Scand., Copenhagen

29:345-472 (No. 4) 1951. **Partial Index**

*Combined Effect of Streptomycin and Penicillin, Streptomycin and Sulfatiazole, and Streptomycin and *p*-Aminosalicylic Acid (PAS) on Tubercle Bacilli. E. Espersen.—p. 350.

Incidence of Penicillin-Resistant Pathogenic Staphylococci Isolated from Upper Respiratory Tract of Healthy Young Persons. Th. M. Vogelsang. —p. 363.

Investigation of Passage of Dihydrostreptomycin from Blood into Cerebrospinal Fluid in Lymphocytic Meningitis. J. Lenstrup.—p. 379.

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Influence of Estrogenic Hormones on Prostate: Estrogenic Reactions in Human Prostate After Artificial Hormone Administration, in Normal Human Prostate at Birth, and in Cases of Senile Hyperplasia of Prostate. A. H. I. Jakobsen.—p. 419.

Insulomas. V. Eskelund.—p. 426.

*Effect of Ice Water upon Development of Skin Lesions Due to Mustard Gas in Rabbits. O. E. Hansen and L. Kreyberg.—p. 468.

Combined Effect of Streptomycin and Other Antibacterials on Tubercle Bacilli in Vitro.—Since streptomycin is frequently used with other antibacterial remedies in the treatment of tuberculosis, the combined effects of streptomycin and other drugs were investigated in vitro on tubercle bacilli. The studies were carried out on the E_8 strain of human tubercle bacilli in fluid Dubos' medium. It was found that in Dubos' medium there is a pronounced synergistic effect of streptomycin and penicillin on growth of tubercle bacilli; 1/32 unit of streptomycin plus 40 units pencillin per milliliter produces complete inhibition. Streptomycin plus sulfathiazole also has a synergistic effect, and 1/32 unit of streptomycin plus 5 mg. sulfathiazole effects complete inhibition. Streptomycin plus *p*-aminosalicylic acid has a synergistic effect, and 1/32 unit of streptomycin plus 0.25 mg. of *p*-aminosalicylic acid completely inhibits growth.

Effect of Ice Water on Skin Lesions from Mustard Gas.—The local as well as the general injuries due to mustard gas are severer in hot than in temperate climates. The explanation is probably that perspiration as well as the high temperature facilitates penetration of the mustard gas into the skin and the general circulation. Hansen and Kreyberg investigated the protective effect of cold against mustard gas, since in Norway cold water, ice, or snow is available for about half of the year. Four series of experiments on rabbits are described, which show that cooling reduces the skin damage produced by the application of 2% solution of mustard gas. The reduction is greatest when the exposed area is in direct contact with the ice water. The reduced damage in the cooled tissue surrounded by water can probably be explained by the fact that cooling reduces the absorption, and thereby facilitates washing away of a part of the mustard gas before it penetrates into the skin.

British Journal of Ophthalmology, London

36:1-56 (Jan.) 1952

*Pituitary Exophthalmos: Assessment of Methods of Treatment. K. Hermann.—p. 1.

Proptosis Caused by Lipoidosis. A. B. Handousa.—p. 20.

Partial Transplantation of Levator Palpebrae Superioris in Superior Rectus Palsy. H. B. Stallard.—p. 26.

Preliminary Report on Use of Methonium Compounds and General Anaesthesia in Ophthalmic Surgery. B. W. Rycroft and G. J. Romanes. —p. 29.

Anatomical Study of Retinal Circulation. J. François.—p. 37.

Circulation of Aqueous Humour and Experimental Determination of Its Rate of Flow. E. J. Ross.—p. 41.

Pituitary Exophthalmos.—Progressive edematous exophthalmos of proptosis with paralysis of the eye muscles is due to excess pituitary thyrotropic hormone, and its development is favored by thyroid deficiency. Thyroidectomy and the use of antithyroid substances are contraindicated even when there is a simultaneous hyperthyroidism because they might further stimulate the pituitary and increase the danger to the eyes. Failure of the hyperactive thyroid to depress pituitary thyrotropic activity differentiates this condition from acute Graves' disease, in which the output of thyrotropic hormone is known to be low. Radiation of the pituitary combined with local surgical measures to protect the eyes is the treatment of choice. In a series of 12 patients no further progression of the malady occurred after radiation, and the final result was either wholly or reasonably satisfactory. Dosage ranged from 3,000 to 5,000 r, delivered over periods of from 10 to 61 days. Ophthalmoplegia may persist if the changes in the muscles have become irreversible; the duration of diplopia and the severity of muscular defect before treatment determine the prognosis. Damage to the eye from corneal exposure may be avoided by tarsorrhaphy; if intraorbital pressure is rising rapidly, orbital decompression must also be carried out. Improvement in general health and diminution of thyrotoxic symptoms followed x-ray treatment of the pituitary in patients with concomitant hyperthyroidism.

British Journal of Radiology, London

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Two Techniques for Treatment of Non-Malignant Lesions of Eye by X Rays. R. J. Walton.—p. 9.

Potential Source of Danger: Emission of X Rays from Rectifying Valves in X-ray Therapy Units. R. E. Ellis and L. H. S. Clark.—p. 17.

Cystogastrocolic Band: Radiological Considerations. E. Samuel.—p. 19.

Technique for Paediatric Bronchography. H. M. Wood and R. Astley. —p. 22.

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II. Response of Human Tissues to Radiation with Special Reference to Differentiation. A. Glücksmann.—p. 38.

III. Regeneration and -SH Changes in Guinea Pig Skin After X-Ray Treatment. J. Frederic.—p. 43.

IV. Systemic Enzyme Changes Induced by Radiation Therapy of Malignant Tumours. P. M. West.—p. 44.

British Medical Journal, London

1:175-230 (Jan. 26) 1952

Generalized Osteoarthritis and Heberden's Nodes. J. H. Kellgren and R. Moore.—p. 181.

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Psychiatric Study of Six Cases of Infantile Acrodynia. D. Leys and K. Cameron.—p. 191.

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Extensive Resection of Small Intestine: Short Review, with Two New Cases. H. J. Croot.—p. 195.

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"Trigger-Thumb" Simulating Paralysis: Report of Two Cases. A. Zinovieff.—p. 199.

1:231-286 (Feb. 2) 1952

*Treatment of Embolism and Thrombosis of Cerebral Vessels. R. Leriche. —p. 231.

Further Observations upon Diagnosis of Deafness in Young Children, with Particular Reference to Making of Recommendations for Special Educational Treatment. M. R. Dix and C. S. Hallpike.—p. 235.

Habitual Abortion: Further Observations on Prophylactic Value of Progesterone Pellet Implantation. P. M. F. Bishop and N. A. Richards. —p. 244.

Acute Polyarthritis with Pulmonary Consolidation and Pleural Effusion. A. W. Lees.—p. 246.

*Duration of Action of Different Insulins. F. Gerritzen.—p. 249.

Treatment of Hypertension by Oral Methonium Compounds. A. J. M. Campbell, J. G. Graham and R. D. H. Maxwell.—p. 251.

M. & B. 1863, Homologue of Hexamethonium, in Treatment of Hypertension. S. Locket, P. G. Swann, W. S. M. Grieve and H. P. Player. —p. 254.

Treatment of Cerebral Embolism and Thrombosis.—Leriche describes his experience with several procedures designed to improve cerebral circulation in cases of cerebral embolism and thrombosis. These procedures are based on the theory that localized spasm of the small cerebral arteries always accompanies embolism or thrombosis, that this produces a perifocal zone of functional ischemia, and that the ischemia can be relieved by interruption of sympathetic nerve impulses to these vessels. In support of this theory Leriche cites the histories of two patients with hemiplegia and aphasia following traumatic thrombosis or stenosis of the carotid artery, who improved dramatically following stellate ganglion block and pericarotid sympathectomy or resection of the thrombosed carotid artery. Other patients with hemiplegia improved considerably following stellectomy or section of the communicating branches of the

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cervical sympathetic chain. Infiltration of the stellate ganglion also produced remarkable improvement in hemiplegia due to birth trauma and in early cerebral vascular accidents. Infiltration should be performed as early as possible on the side opposite the paralysis, beginning with 10 cc. of 1% procaine solution. Six hours later 20 cc. should be injected, followed by 20 cc. daily for 15 days. There seems to be some advantage in occasionally giving the injection on the side of the paralysis and even in associating lumbar infiltration with stellate ganglion block. Sympathectomy is not necessary in early cases, and should be reserved for patients with a poor prognosis who have had repeated vascular accidents. Leriche prefers section of the vertebral nerve roots at the upper pole of the stellate ganglion rather than ganglionectomy, since the former procedure interrupts most of the constrictor fibers to the basilar artery. In some cases of hemiplegia of several years' duration he has obtained favorable results with repeated stellate ganglion blocks.

Action of Different Insulins.—This investigation was undertaken to compare different insulins under the same experimental conditions, and to ascertain the duration and character of their action. The subjects were young healthy student volunteers, whose blood sugar was investigated under standardized conditions. In the control group no significant deviation was found between the average blood sugar values at different hours. There was, however, a significant deviation between the blood sugar values of different persons. The studies with regular insulin revealed that the blood sugar reaches its lowest point after one hour and returns to its starting point in eight hours. With regard to protamine zinc insulin, the author's observations differed from those reported in the literature. He found that it was active for 18 hours, not for as long as 48 hours. The lowest blood sugar levels were reached in five to eight hours. Di-insulin acts for 16 hours. The greatest decrease in blood sugar is during the first three hours. Isoinsulin is active for 17 hours, with rapid decrease of sugar in the first hour. The steep decrease within the first hour leads to the assumption that this preparation contains regular insulin, but, according to Haalas Möller, this is not the case. The action of globin-insulin is identical with that of di-insulin. N. P. H. 50 insulin acts for 11 hours. The lowest blood sugar levels appear after three to four hours. Experiments with mixtures gave the impression that the duration of action of the mixture depends on the regular insulin content only so far as the decrease during the first three hours is greatest with the mixture containing the largest amount of regular insulin (the 3:1 mixture) and that thereafter the blood sugar takes longer to come back to the original level than with the 2:1 and the 1:1 mixtures. This would explain the longer duration of the action with a higher regular insulin content.

Deutsche medizinische Wochenschrift, Stuttgart

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*Influence of Muscular Exertion on Hypotension. A. Weiss.—p. 166.
Bacteriostatic Treatment of Acute and Chronic Infections of Biliary Tract. W. Schulz and H. Voth.—p. 170.
Contributions of Internal Medicine to Kretschmer's Theory of Constitution. D. Jahn.—p. 176.

Felty's Syndrome and Chronic Polyarthritis.—The case of a patient who had chronic polyarthritis with roentgenologic evidence of osteoarthrotic changes on all joints of the extremities, as well as hepatosplenomegaly and leukopenia, reminded Störmer of literature reports on Felty's syndrome. He discusses this syndrome and rejects the idea that it can be regarded as a separate entity. He suggests that infections and allergic processes are involved, the localization, severity, and course of which is governed by the nervous system. From this point of view, Felty's, Still's, and Sjögren's syndromes cannot be regarded as separate entities, but are all forms of chronic polyarthritis. There are transitional forms that can also be considered forms of nonspecific rheumatic polyarthritis. In all these cases the arthritis may be related to hidden foci of infection.

Influence of Muscular Exertion on Hypotension.—In earlier investigations Weiss had studied the effect of muscular exertion on hypertension, and in this paper he describes studies on patients with hypotension. Persons with normal blood pressure served as controls for both groups. It was found that after the period of recovery that followed the exertion, patients with hypotension showed an increase in blood pressure, whereas many of those with hypertension showed a decrease in blood pressure. Thus muscular exertion acts as a stimulus in hypotension and as a sedative in hypertension, that is, it acts as a counter-regulator.

Glasgow Medical Journal

33:1-32 (Jan.) 1952

*Acute Perforated Peptic Ulcer: Study of 509 Cases. A. A. Bonar and D. J. Livingstone.—p. 1.
Weil's Disease in Glasgow Fishmarket. J. G. Goudie, I. B. L. Weir and T. S. Wilson.—p. 9.
Penicillin Treatment of Acute Haematogenous Osteitis: Review of Some Unsatisfactory Results. W. M. Dennison.—p. 16.

Acute Perforated Peptic Ulcer: Study of 509 Cases.—Experience at the Glasgow Royal Infirmary from 1935 to 1950 showed a marked decline in postoperative mortality following peptic ulcer perforation. Simple surgical closure of the perforation is the best treatment in this emergency. Advanced age and long preoperative delay increase the surgical risks, but are not contraindications to operation. Chest complications are especially frequent following perforated peptic ulcer, but their seriousness has diminished since the introduction of penicillin and the sulfonamides. Peritoneal and cardiovascular complications have declined in frequency and severity. The average hospital stay in 1935-37 was 22.8 days; in 1948-50 it was only 16.5 days, reflecting the improvement in the postoperative course. The downward trend in mortality and morbidity is attributable to the sulfonamides, penicillin, and modern anesthetic methods.

Journal of Endocrinology, London

8:1-88 (Jan.) 1952. **Partial Index**

Studies of Human Thyroid Function, Measured by Radio-Iodine, and Its Relation to Basal Metabolic Rate. M. Reiss, C. P. Haigh, R. E. Hemphill and others.—p. 1.
Fluorimetric Determination of Oestrogens. H. Braunsberg.—p. 11.
Effect of Ephedrine on Excretion of Reducing Steroids, 17-Ketosteroids and Uric Acid in Healthy Men. B. M. Bray, W. H. H. Merivale and D. R. C. Willcox.—p. 27.
Some Effects of Administering 'Anti-Thyroxine' Compounds to Rats. A. Lawson and C. E. Searle.—p. 32.
Adrenocorticotrophic-Like Activity in Plasma. J. Bornstein, C. H. Gray and D. M. V. Parrott.—p. 40.
Plasma and Urinary Amino-Acids in Diabetes. C. H. Gray and E. K. B. Illing.—p. 44.
Diabetogenic Activity as Inherent Property of Growth Hormone. E. Reid —p. 50.
Studies on Antibody Formation to ACTH in Man. B. E. Clayton, R. M. Hardisty and J. L. Pinniger.—p. 56.

Lancet, London

1:221-270 (Feb. 2) 1952

Surgical Treatment of Hyperfunctioning Lesions of Adrenal Cortex. W. Walters.—p. 221.
Results of Partial Gastrectomy for Peptic Ulcer. C. N. Pulvertaft. —p. 225.
Psychology and Maternity Unit. E. Tylden.—p. 231.
Role of Pituitary and Adrenal Glands in Inhibition of Hyaluronidase by Salicylates in Vivo. M. Pelloja.—p. 233.
Improved Cell for Hartridge Reversion Spectrometer. W. W. Walther and E. G. Millwood.—p. 237.
*Results of Protracted Treatment of Idiopathic Steatorrhoea. J. Badenoch. —p. 238.
*Significance of Pallor in the School-Child. J. Yudkin.—p. 239.
Acute Yellow Atrophy of Liver Following Treatment with Phenylacetyl-Urea. L. A. Liversedge, P. O. Yates and H. Lempert.—p. 242.

Treatment of Idiopathic Steatorrhea.—Seven patients with steatorrhea who had been treated for 9 to 42 months since the first estimation of the fat balance were selected for investigation. None of them had visited countries where tropical sprue is endemic, and in all of them pancreatic disease had been excluded because the excretion of nitrogen in the feces was normal. Every patient had had symptoms for more than 3 years, and one for 10 years. The treatment given included a high protein, low fat, low starch diet, with 5 to 15 gm. of calcium lactate, 4,000 I. U. of vitamin A, 10,000 I. U. of vitamin D, and 20 mg. of folic acid daily by mouth. To determine the fat bal-

ances the patients were given a test diet containing 70 gm. of protein and 70 gm. of fat daily. There was clinical improvement in every case, and fat balances revealed a significant decrease in the excretion of fat. In two cases the loss of fat in the feces fell to within normal limits. None of the patients relapsed during the period of study. The present series of cases differs from those reported by other workers in the length of observation and in the administration of folic acid throughout this period. All patients improved, and the improvement was maintained during the period of study. It is tempting to ascribe this result to the use of folic acid. The mainstay in the treatment of steatorrhea is still the provision of a suitable diet and the treatment of the deficiencies in vitamins and minerals that are likely to occur.

Significance of Pallor in the School Child.—The significance of pallor in children who are otherwise apparently well was investigated in about 1,200 Cambridge school children, aged 4 to 11 years. This survey shows that, compared with the child of normal color, the pale child is more likely to weigh less, to be of a lower state of nutrition, to have a lower Tuxford index, and possibly to be shorter and to have a weaker grip. The hemoglobin level is not related to pallor. A pale child is just as likely to have a high or low level of hemoglobin as a child who is not pale. The level of hemoglobin is not associated with most of the other factors studied, and the only association found was a lower level in children from larger families. In particular, levels as low as 75% of the normally accepted standards may apparently exist with no untoward effect. Two explanations are suggested for the observation that the hemoglobin level was apparently independent of nutritional state, physique, or performance. One is that this represents true physiological variation, and that, in many instances, neither iron nor any other substance is the limiting factor in the production of hemoglobin. The second is that the lower levels may not be maximal but are nevertheless adequate for all bodily functions. This is supported by the observations of Magee and Milligan on the hemoglobin of women before and after labor, many of whom had low levels that could be raised by administration of iron. They observed that most of the women, whether taking iron or not, were healthy and had no complaints, which raised the question whether a hemaglobin level raised by iron therapy is an advantage.

Nervenarzt, Heidelberg

23:1-40 (Jan. 20) 1952. **Partial Index**

*Multiple Sclerosis as Virus Disease. J. Hallervorden.—p. 1.
Neurosurgical Treatment of Congenital Megacolon: Its Foundations and Clinical Results. T. Hansen.—p. 9.
Clinical and Pathologic Aspects of Lesions of Peripheral Nervous System Caused by Sulfonamides. H. Glückert and W. Benoit.—p. 17.
Question of Impaired Liver Function in Endogenous Psychoses. H. J. Chemnitz.—p. 31.

Multiple Sclerosis as Virus Disease.—Although the entity of multiple sclerosis has been recognized for more than a century, its etiology is still unknown. It is designated as "sclerosis" because the fiber formation in the proliferated glia involves "hardening," although the essential characteristic of these foci is a special form of demyelinization. Hallervorden shows that there is a surprising parallelism between the so-called ring spot diseases of plants (such as tobacco mosaic virus and potato X-virus disease) and multiple sclerosis. The same forms of concentrically stratified foci, of simple continued foci, and of combinations of these are found in the ring spot diseases and in multiple sclerosis. The development of these foci can be traced to the diffusion of a steadily increasing infective agent, which in plants has been demonstrated to be a virus. The stratification of the concentric foci can probably be traced to the rhythmical formation of defense substances in the tissues. Such defense substances against virus have been demonstrated in plants. The haphazard localization of foci is the same in the plant and human diseases, but both also have certain sites of predilection. Dissemination takes place in the parenchyma as well as by way of the vascular system. There is fixation to a certain tissue substrate and thus to a certain organ. The author feels that the purely morphological similarities between the plant and human diseases, which reveal identical modes of dissemination, justify further search for a virus origin of multiple sclerosis.

Presse Médicale, Paris

60:61-80 (Jan. 19) 1952

*Pulmonary Embolism Causing Hemorrhage in 2 Cases of Phlebitis Treated with "Tromexan." L. de Gennes and Beaumont.—p. 61.
Restlessness and Nocturnal Paresthesia Agitans of Lower Extremities. M. Bonduelle.—p. 62.
Neuroendocrine System in Ancylostomiasis. J. Moreira da Fonseca.—p. 64.

Hazards of Ethyl Biscoumacetate Treatment in Phlebitis.—Two patients, a man, aged 44, with postinfluenzal phlebitis, and a woman, aged 81, with postoperative phlebitis, were treated with daily doses of 600 mg. of ethyl biscoumacetate (tromexan®). In both patients the local and general symptoms of the venous thrombosis did not respond to the treatment, despite maintenance of the prothrombin level between 15 and 20% of normal, a presumably safe and effective therapeutic range. Pulmonary embolism resulting in infarction occurred on the 8th day of the treatment in the man and on the 14th day in the woman. Within 36 and 48 hours, respectively, after the occurrence of the pulmonary embolism severe hematuria appeared, lasting three days despite discontinuation of treatment with ethyl biscoumacetate. Profuse hemoptysis occurred simultaneously, and one patient had ecchymosis at the elbow. In both patients the prothrombin level was not lower when the hemorrhages occurred than it was before the occurrence of the pulmonary embolism. One of the authors reported in a previous paper that by using the in vitro heparin tolerance test, a considerably prolonged period of hypocoagulability could be demonstrated in more than 80% of cases following formation of a thrombus in the pulmonary artery. Thus the hypocoagulability secondary to the embolism combined with that resulting from the therapeutic hypoprothrombinemia may have been responsible for the undesirable effects of the anticoagulant therapy in the two patients. Because of these spontaneous changes in the coagulability of the blood that may be observed in the course of venous thrombosis, safe control of treatment with bishydroxycoumarin derivatives cannot be obtained by determination of the prothrombin level alone. In vitro heparin tolerance tests should also be performed to evaluate the effect of hypoprothrombinemia on the coagulability of the blood and to measure the results of spontaneous and therapeutic changes in the blood. These tests will indicate whether the dosage of the drug should be increased in case of persistent hypercoagulability despite definite hypoprothrombinemia, or whether the dosage should be reduced in case of excessive hypocoagulability, even if the prothrombin level has not been lowered beyond the limits erroneously considered as safe.

Wiener medizinische Wochenschrift, Vienna

102:87-104 (Feb. 2) 1952. **Partial Index**

Transmission of Poliomyelitis in Pregnancy and Delivery. H. Braitenberg.—p. 87.
Concept of Arrest of Heart's Action in Diphtheria and Its Prevention. K. Gerhold.—p. 92.
*Roentgen Irradiation of Thyroid as Method of Treatment for Eczema. F. Hammer.—p. 98.

Roentgen Irradiation of Thyroid for Eczema.—Of 1,000 patients with chronic eczema, 900 recovered completely with local irradiation with minimum doses of soft roentgen rays, while previous treatment with ointments had failed. In the remaining 100 patients the eczema proved refractory to local irradiation treatment; these patients presented the typical symptoms of thyrotoxic disturbances, although the Merseburg triad was not always manifest. Based on the concept of hormonal influence on extremely refractory dyshidrotic eczema, 70 of the 100 patients were given irradiation therapy of the thyroid with small doses of 100 to 200 r to each of its lateral lobes, and with the following technical factors: 168 kv. 4 ma., 30 cm. focal-skin distance, 8 by 10 field size and 0.5 mm. Cu. That was followed by two or three local irradiations with 30 r. Considerable improvement and occasionally complete recovery resulted within 8 days in some patients, and within 14 to 21 days in others. Irradiation of the thyroid was repeated for a second time in 17 patients. The highly satisfactory results of the thyroid irradiation demonstrated its favorable effect on the eczema, and proved that dysfunction of the thyroid had been responsible for the refractory course of the eczema.

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BOOK REVIEWS

A Textbook of Clinical Neurology with an Introduction to the History of Neurology. By Israel S. Wechsler, M.D., Clinical Professor of Neurology, Columbia University, New York. Seventh edition. Cloth. $9.50. Pp. 801, with 179 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1952.

This is one of the most popular textbooks of neurology in the English language. It has been written by one of the most outstanding neurologists and teachers of this country. In this edition the author has made a thorough revision and brought the text up-to-date. This is an excellent book for students. It is clearly written. Each subject is concisely presented. The information presented is in accord with the latest opinions and investigations in the field. The illustrations are well selected and well reproduced. There is an adequate bibliography and a good index.

As is to be expected in a textbook of this type the discussion of few subjects is exhaustive. The book is thus more suitable for student use than as a reference work. Many of the more minor subjects are dismissed with only a few words. There are few statements with which anyone familiar with the field would disagree, but there are some. It was in monkeys rather than "lower apes" that section of the pyramidal tract failed to induce a condition in which Babinski's sign could be elicited. A rise of only 35 to 50 mm. of pressure in the spinal fluid on Queckenstedt's test would be unusually low. Few persons would agree that the value of tracheotomy in suitable cases of bulbar poliomyelitis was still in doubt. Unfortunately pantopaque myelography is not always sufficient to differentiate multiple sclerosis from a lesion compressing the spinal cord. The author did not describe or illustrate the characteristic appearance of hemangioma of the vertebra in the x-ray film. The statement that operations are of little avail in chronic hypertrophic pachymeningitis of the cervical spinal cord is misleading. The author's implication that treatment is beneficial in cases of progressive muscular dystrophy is not a straightforward statement of the facts. Skew deviation of the eyes is generally believed to result from lesions in the brain stem or in the middle cerebellar peduncle rather than from true cerebellar lesions. The lower part of the lower extremity is not represented in the upper part of the precentral gyrus on the convexity of the cerebral hemisphere as is illustrated on page 300. It is not true that "operation is not indicated in metastatic abscesses" of the brain, and the author's following qualifying statement does not adequately correct the erroneous impression left by the positive statement quoted above (page 418). The treatment of intracranial aneurysms and of spontaneous subarachnoid hemorrhage is not adequately presented. There is no good evidence that the tremor of paralysis agitans has been eliminated by excision of the caudate nucleus or the removal of area 6 (of Brodmann). The Kayser-Fleischer corneal ring is not mentioned in connection with the hepatolenticular degeneration of Wilson, although it is mentioned in connection with the pseudosclerosis of Westphal.

In an unfortunately large number of instances neurological diseases are chronic diseases. In the treatment of these the attitude of the patient and the physician's approach to the patient and his problems are often of far more importance in the rehabilitation of the patient than are specific remedies. The author has neglected this phase of his subject. He has not outlined to the student what a proper psychological approach would be with the epileptic, the victim of multiple sclerosis, or the patient with peroneal muscular atrophy.

The reviews here published have been prepared by competent authorities and do not represent the opinions of any official bodies unless specifically stated.

Callander's Surgical Anatomy. By Barry J. Anson, M.A., Ph.D. (Med. Sc.), Professor of Anatomy, Northwestern University Medical School, Chicago, and Walter G. Maddock, M.S., M.D., F.A.C.S., Elcock Professor of Surgery, Northwestern University Medical School. Third edition. Cloth. $14. Pp. 1074, with 929 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1952.

This most recent edition of a well-known book should be received enthusiastically by medical students as well as accomplished surgeons. The book was originally planned with the definite idea of suggesting the paths of surgical approach to the pathological process to be removed or corrected. The new coauthors have faithfully adhered to this program in the old chapters as well as in new additions. The chapter on the thoracic cavity is a new, masterly presentation of a subject that has been attracting much attention in the last decade. The chapter on the abdominal cavity has been rewritten to include portacaval anastomosis and many valuable details pertaining to gallbladder surgery, such as variations in the origin of the cystic artery.

Some old illustrations have been completely omitted or replaced by new ones from the senior author's "Atlas of Human Anatomy." The elimination of figure 316 of the first edition, which shows the deep lateral view of the thyroid region, is regrettable. Reproduction of this figure, which has a great didactic value, would advantageously supplement figure 194 in the new edition. Figure 8, showing the interior of the base of the skull, lacks the clarity of the old figure 13. The prohibitive cost of color illustrations, which enhance the value of anatomic atlases and books, is probably responsible for their omission from the new book. This is unfortunate, as it puts domestic publications at a disadvantage when they are compared with continental issues.

The pages are set in double columns to increase reading ease. This book, printed in clear type, on good paper and attractively bound, is a worthy successor to the first two editions and as such is wholeheartedly recommended to students and surgeons alike.

Symposium on Steroids in Experimental and Clinical Practice. Edited for Committee on Arrangements by Abraham White. Cloth. $7.50. Pp. 415, with 103 illustrations. Blakiston Company (division of Doubleday & Company, Inc.), 1012 Walnut St., Philadelphia 5, 1951.

This symposium was organized by S. A. Syntex of Mexico, in order to discuss the effects of the natural and synthetic 11-desoxy steroids in physiological and pathological states. Animal and human studies utilizing Δ5-pregnenolone, 21-acetoxypregnenolone, desoxycorticosterone acetate, Reichstein's compound L (3 β-acetoxy-17 α-hydroxyallopregnan-20-one), progesterone, and their various esters were reviewed by the attending investigators. It was shown that this group of steroids had many physiological effects, which could be classified as folliculoid, testoid, luteoid, corticoid, spermatogenic, renotropic, anesthetic and antifibrinomatogenic. Pregnenolone and progesterone apparently have effects on animal heart muscles similar to digitalis in respect to excitability and rhythm but opposite in effect on contractility. Certain of the 11-desoxy compounds in large doses have shown inhibitory effect on development of the chick embryo. While this was hoped to indicate antitumorogenic effect, the most potent compounds were ineffective in treating human cancer.

Controversial papers on the effects of testosterone propionate and pregnenolone in the treatment of rheumatoid arthritis were read by clinicians not experienced in the long-term treatment of this condition. Claims of benefit with these steroids were emphatically refuted by more experienced clinicians on the basis of controlled studies utilizing American Rheumatism Association criteria and grading. A most interesting review of the role of steroids in the treatment of neoplastic disease closes the book.

Recent Advances in Bacteriology. Edited by J. H. Dible, M.B., F.R.C.P., Professor of Pathology, Postgraduate Medical School of London, University of London. Third edition by J. D. MacLennan, M.B.E., M.D., with assistance of Mary Barber, M.D. Cloth. $5. Pp. 322, with 14 illustrations. Blakiston Company (division of Doubleday & Company, Inc.), 1012 Walnut St., Philadelphia 5, 1951.

Contributions in the various fields of bacteriology in the last two decades have been so voluminous that their compression into a small book can be only a summary review. As such, the authors of this book have succeeded in presenting a very readable account.

Highlights of the progress in bacterial morphology, physiology, and nutrition are presented in the first few chapters. Also included is a simple, clear description of the fundamentals of the electron microscope. Subsequent chapters are devoted to the following bacteria of medical importance: staphylococci, streptococci, Clostridia, Corynebacteria diphtheria, enteric organisms, and anaerobes. Each of these groups is discussed briefly from the point of view of classification, toxin production, and pathogenicity.

Of particular interest is the chapter on anaerobic coccal diseases of man. The authors state that the newer chemotherapeutic agents, which have been so effective in the treatment of aerobic coccal infections, have little value in combating the anaerobic cocci. Wound and human bite infections, postoperative synergistic gangrene, chronic undermining burrowing ulcer, and the highly fatal anaerobic coccic puerperal sepsis are all diseases in which surgical intervention is still the best treatment. The importance of employing anaerobic methods in the diagnosis of infections is emphasized. The authors warn the clinician against the acceptance of reports of sterile pus, sterile blood, and sterile culture, without having ruled out the anaerobes.

A serious omission in this book is a discussion of the recent advances in tuberculosis; nor are there any chapters on the Brucella, Neisseria, spirochetes, and Rickettsia. The viruses have been purposely omitted, since the authors felt that they now belong to a special branch of biology outside the field of bacteriology. The last three chapters include extremely short discussions on the sulfonamides and antibiotics.

This brief discourse on the advancements in the field of bacteriology during the past 20 years can be found in more expanded form in any recent bacteriology textbook and is therefore recommended only as a light and entertaining review.

Cleft Lip and Palate. By W. G. Holdsworth, F.R.C.S., Surgeon, Rooksdown House, Basingstoke, Southampton, England. With foreword by Sir Harold Gillies, C. B. E., F.R.C.S. Cloth. $5.50. Pp. 126, with 87 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1951.

This book covers the following subjects: the lip and palate, development, clefts, cleft lip, cleft palate, secondary operations, nursing care, and anesthesia. Although it would not be unorthodox, it probably would have been better to have the section dealing with embryology precede the one dealing with anatomy. Herein is described a common deformity and some of the ways in which it can be treated. The shortcomings of the various methods of treatment are discussed, and a sincere effort is made to present the problems in their true perspectives. Showing the ectoderm in green and the endoderm in red in all of the plates is helpful, despite the diagrammatic presentation of this material. Such details as armamentarium, nursing care, and anesthesia have not been overlooked. The material is presented in clear and concise style. This book can be recommended to anyone interested in the cleft lip and palate.

Traité de thérapeutique chirurgicale. Tomes I et II. Par P. Bertrand et J. Creyssel, professeur agrégé à la Faculté de médecine, Lyon. Cloth. 23000 francs per set. Pp. 1843; 1947-3369. Gaston Doin & Cie, 8 place de l'Odéon, Paris, 6e, 1951; 1952.

This encyclopedic work in two volumes consists of 3,369 pages written by two widely experienced surgeons. It is devoted to the subject of surgical therapy, without description of the technique. In view of the fact that comprehension of therapeutic measures is based on familiarity with the anatomy, pathogenesis, etiology, and clinical picture of the condition, all these factors have received consideration in the discussion of each surgical lesion.

The first chapter, which deals with anesthesia, also gives a birdseye view of the therapy used for postoperative conditions. In the second chapter, therapeutic adjuvants of surgical procedures, such an anti-infectious treatment and blood transfusions, are described. The following chapters are devoted to an outline of the treatment of diseases of various tissues, such as skin, muscles, tendons, blood vessels, or bones. Finally, therapy of lesions of the extremities, the spine, and the chest is described without detail. The scope of the work is immense, in addition to general surgery in the strict sense of the word, it encompasses selected problems in gynecology, urology, orthopedics, and neurosurgery. The authors have selected from these fields, in an arbitrary fashion, conditions that come within the scope of the general surgeon.

The deliberate elimination of photographs greatly detracts from the didactic value of the book, because, not infrequently, a good illustration is more instructive than a lengthy explanation. Omission of a bibliography also limits the value of this type of a reference book considerably. A cursory perusal of the text failed to locate discussion of such important subjects as hypokalemia, tests employed in the study of varicose veins, or the use of nitrogen mustard in treating malignant growths. The most disconcerting feature of this book is the nebulous verbosity and innumerable repetitions attributable to the singular arrangement of the text. Although the two volumes contain a wealth of up-to-date information, the material pertaining to the same subject is scattered throughout various chapters. The print is large and easily read, the paper of excellent quality, and the binding attractive. There is a good index. Streamlining and condensing this work into a book of lesser size would automatically eliminate much of the adverse criticism.

The Better Half of Your Life: How to Live in Health and Happiness from Forty to Ninety. By Charles H. Lerrigo, M.D. Cloth. $3.50. Pp. 270. John Day Company, Inc., 210 Madison Ave., New York, 1951.

In a simple, understandable, common sense way, Dr. Lerrigo tells the reader how to add more years to his life as well as how to add more life to his years. He discusses, in some detail yet at the same time in a simple way, most of the technical problems associated with aging. Throughout his discussion, he has liberally sprinkled the sharp wit that characterizes his conversation, so that the book becomes easy and interesting reading. Not only could this be read by nonmedical persons who are past 40, because they are interested in the years past 40, but it could be read by physicians of any age to give them insight into some of their own problems as well as the problems of their senior patients. Dr. Lerrigo spends considerable time on emotional health, on the adjustment to the normal infirmities of aging, on personal attractiveness, on hobbies, and on the problem of where and how older persons will live. His whole story is woven around the general theme expressed by Browning in "Rabbi Ben Ezra." "Grow old along with me, the best is yet to be. The last of life for which the first was made."

The Photography of Patients Including Discussions of Basic Photographic and Optical Principles. By H. Lou Gibson, F.B.P.A., A.P.S.A. Publication number 95, American Lecture Series, monograph in American Lectures in Medical Photography, edited by Ralph P. Creer, Secretary, Committee on Medical Motion Pictures, American Medical Association, Chicago. Cloth. $5.50. Pp. 118, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, 1952.

The use of photography in medicine has grown in importance through the years to the point where it is now almost indispensable as an aid in teaching, in the dissemination of knowledge, and in scientific investigation. The photography of patients represents a large portion of the various services offered by a clinical photography department, and an authoritative book on the subject is most useful. The author of this book has organized his text, so that it will be helpful to the "snapshooter" as well as the experienced medical photographer. The opening chapter on fundamentals briefly discusses the purpose of the picture to be taken and the importance of preplanning. Later, the selection of equipment, which includes cameras, lights, exposure meters, proper background, and darkroom items is discussed. Those who wish to take close-up pictures with the

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amateur roll film camera will find practical suggestions, including a table of lighting and exposure data. The well-illustrated section on the basic principles of lens properties is presented in simple concise terms. The selection of film and proper filters for the recording of various types of medical subjects is discussed. Several pages are devoted to the use of color films, and there is a series of simple tables giving exposure data. There have been many poor prints made from good negatives; thus, this monograph appropriately ends with several helpful suggestions regarding printing methods and print quality. A good many excellent illustrations (four in color) are used to document this text. The book is completely indexed, but only a few references to the literature are cited. Physicians who make photographic records in connection with their office practice will find much practical and useful information in this book. It is recommended to the average clinical photographer in hospitals and medical schools, and it should be on the shelf of medical school libraries. It is not designed as a postgraduate course for the expert.

Individual Differences in Colour Vision. By R. W. Pickford, M.A., Ph.D., D.Litt. Cloth. $5. Pp. 386, with illustrations. The Macmillan Company, 60 Fifth Ave., New York 11; J. W. Arrowsmith, Ltd., 12 Small St., Bristol 1, 1951.

The author summarizes a vast amount of experimental work on the baffling problem of color vision and discusses some excellent new technics. His primary concern is the theoretical explanation of color vision, and his conclusion on this point (page 367) is that a "four-receptor theory, with a separate response-system for brightness, fits the facts with astonishing ease and adequacy, and requires no special pleading to support its claims."

There is also a thorough consideration of genetic theories, from which it becomes clear that the simple statements made on the subject in the past are misleading. The difficulties involved in the study of human inheritance are great in regard to color vision, and the solution of this problem depends not only on the study of many persons and the application of intricate statistical procedures but also on the development of tests that do not predetermine the results. In view of the intricacies of these tests, one cannot too strongly condemn the current misuse of the colored guidelines on Snellen charts for testing applicants for automobile drivers' licenses.

Although the detection, analysis, and explanation of anomalies of color vision have attracted many investigators, some progress is also being made with the study of the ways in which people with these anomalies compensate for their handicaps. The inconsiderate and unsympathetic attitudes frequently manifested by the normal toward the handicapped are exemplified in some of the interesting cases cited by the author (pages 22 to 25 and 229 to 234). Future work should emphasize the positive aspects of the problem such as the search for optimum design and color for road signs (page 35). In addition to being a fundamental contribution, this book is to be commended for its readable style, good index, valuable bibliography, and neat format. It is particularly recommended to physiologists, ophthalmologists, and psychologists.

The Dynamics of Psychological Testing: A Formulation and Guide to Independent Clinical Practice. By Milton S. Gurvitz, Ph.D., Chief Psychologist, Hillside Hospital, Bellerose, N. Y. Cloth. $6.75. Pp. 368, with 26 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1951.

This book describes the methods of application and interpretation of projective testing used in diagnostic clinical psychology. The author attempts to show, through a series of detailed reports on the projective testing of patients, how the psychologist may often closely approximate the diagnosis and description of a patient given by the psychotherapist only after a long period of detailed interview. The book is divided into four parts: a discussion of general problems that the psychologist encounters in the psychological testing of patients, detailed description of the mechanics of testing and the formulations derived from such tests as the Wechsler-Bellevue and Rorschach, results of the psychological tests of seventeen patients and a comparison of the test results with the general impressions of the attending psychiatrist, and an evaluation and synthesis of the methods used in arriving at diagnoses. Twenty-six figure drawings illustrate the author's method of arriving at concepts of underlying patient attitudes by interpretation of the drawings and of the patients associations to the completed picture.

Verhandlungen der Deutschen Gesellschaft für Kreislaufforschung: 17. Tagung zu Bad Nauheim vom 30. März bis 1. April 1951. Hauptthema: Lungenkreislauf. Herausgegeben von Prof. Dr. Hans Schaefer. Paper. 30 marks. Pp. 322, with illustrations. Dietrich Steinkopff Verlag, Holzhof-Allee 25, (16) Darmstadt, 1951.

This volume, written in German, is essentially the report of the 17th meeting, in 1951, of the German Society for the Study of the Circulation and contains the list of previous meetings, the membership, the business report, the chairman's address, 54 reports by authors primarily concerned with the pulmonary circulation, literature references, and pertinent discussions. The book is highly specialized, but it would prove interesting to those interested in pulmonary circulation who are able to read German fluently. There is a great deal of information. Much of the book is in small type, but it is clearly presented and in good form. The book covers 21 years of heart catheterization and prospects for the future, physiology of the pulmonary circulation, functional anatomy of the pulmonary vessels, pathological anatomy of the pulmonary circulation, hemodynamics of pulmonary circulation disturbances, pulmonary circulation and pulmonary function, significance of oxygen pressure, reflexes of the lesser circulation, cor pulmonale and the pulmonary circulation in silicosis, roentgenology of the pulmonary circulation, pulmonary circulation before and after operations for mitral stenosis, electrocardiogram examinations of the lesser circulation, a new classification of hypertension forms, pharmacology of ganglion blocking substances, alveolar aeration in asthma and emphysema, inheritance of hereditary heart failure, circulatory disturbances in osteitis deformans, a new oximeter, indications for aortography, and demonstration of disease of the pulmonary circulation.

The volume covers a wide latitude of subjects on the pulmonary circulation as far as the scientific aspects and views are concerned and, therefore, can be recommended to those who seek to delve into or browse in this intricate phase of human disease and function.

Liver Injury: Transactions of the Ninth Conference April 27 and 28, 1950, New York, New York. Edited by F. W. Hoffbauer, M.D. Cloth. $3. Pp. 232, with illustrations. Josiah Macy, Jr., Foundation, 565 Park Ave., New York 21, 1951.

In this book, the following topics are discussed: (*a*) correlation of hepatic function and structure based on liver biopsy studies, (*b*) needle biopsy of the liver, clinical applications, (*c*) clinical aspects of hepatic vascular physiology, (*d*) studies of hepatic lymphatics, (*e*) the escape of lipid from fatty cysts in experimental dietary cirrhosis, (*f*) kwashiorkor, and (*g*) vitamin B_{12}, folic acid, and the lipotropic agents. Drs. Hans Popper, Leon Schiff, Stanley E. Bradley, Jesse L. Bollman, W. Stanley Hartroft, J. N. P. Davies and Paul Gyorgy are the discussants. Each topic is followed by a record of the discussion of the conference guests. Subject matter and discussions are informally presented on a high scientific plane and in an interesting and readable style. The information represents recent personal investigations of the contributors and will be valuable to physicians interested in liver disease.

Medical Milestones. By Henry J. L. Marriott, M.D. Foreword by Sir Alexander Fleming. Cloth. $3.50. Pp. 293, with 6 illustrations. Williams & Wilkins Company, Mount Royal and Guilford Aves., Baltimore 2, 1952.

This book, written for the layman, reviews a number of recent medical and surgical advances, including antibiotics, heart surgery, antithyroid drugs, and cortisone, corticotropin (ACTH), and DDT. Though the style is distinctly colloquial, the material is for the most part covered in an accurate and conservative manner. The final chapter, designed to encourage the layman to view progress with a due sense of proportion, detracts from the tenor of the book. Readers may well wonder at the author's classification of "canning, freezing, pulverizing, pasteurizing and over-cooking" as "the destructive processes of our civilization" and question his opinion that artificial fertilizers are "the agents which are perhaps undermining our health more than any other factor today."

QUERIES AND MINOR NOTES

ISOLATION AND QUARANTINE REGULATIONS

TO THE EDITOR:—*This town is considering a revision of the regulations concerning isolation and quarantine for communicable diseases. I would appreciate the recommendations of an authority on the subject to present to the board of health.*

Richard J. Rushmore, M.D., Florham Park, N. J.

ANSWER.—The following information was provided by the health department of one of our largest cities. Because of lack of space only general suggestions can be incorporated in this reply. For more specific and detailed information, it would be advisable for the inquirer to contact his state health department in order to coordinate state rules and regulations with those of the local community. In addition, it is suggested that he contact the U. S. Public Health Service, Washington, D. C., and the American Public Health Association, 1790 Broadway, New York 17, to obtain additional suggestions. The regulations for isolation and quarantine vary in different states and communities.

Suggestions for the establishment of the regulations concerning isolation and quarantine for communicable diseases follow. General procedures should be outlined for the control of communicable diseases and should define the establishment, duration, and termination of isolation and quarantine. Detailed procedures for the control of communicable diseases should include measures necessary for the control of patients, contacts, carriers, and sale of food and milk where this applies and general measures necessary to prevent the onset and spread of communicable diseases.

Some of the more important communicable diseases are amebiasis, chickenpox, diphtheria, rubella, measles, mumps, poliomyelitis, scarlet fever, smallpox, and whooping cough. In amebiasis, isolation is not required, but the patient or carrier must submit specimens of feces until three consecutive specimens taken not less than one week apart are negative for trophozoites or cysts of Endamoeba histolytica. Food handling by the patient or a carrier is prohibited until the above requirements have been fulfilled. Chickenpox patients are isolated for not less than 14 days and thereafter until all crusts have disappeared from the skin. No restrictions of contacts are required. In rubella, isolation of the patient is required from the onset of catarrhal symptoms until seven days after the appearance of the rash. No restrictions of contacts are required. Great care should be exercised to prevent the exposure of susceptible pregnant women to rubella. Measles patients are isolated from the onset of catarrhal symptoms until five days after the appearance of the rash and thereafter until the catarrhal symptoms and the abnormal secretions of the mucous membranes have ceased. Susceptible children living on the premises with the patient should be isolated for 14 days from the date of first exposure. In addition, all children under 3 years of age who have been exposed to measles should be treated with immune globulin in a dosage sufficient to prevent or modify the disease. Mumps patients are isolated until the swelling of the glands has disappeared. There are no restrictions on contacts. Acute anterior poliomyelitis patients are isolated for one week from the date of onset and thereafter until the temperature is normal for 24 hours. Children having had direct contact with a patient should be kept under medical surveillance for two weeks from the date of last exposure. Voluntary limitation of physical activity of such children is recommended. General measures should include a warning to physicians and the laity of the prevalence of the disease, a description of the usual characteristics of the onset of the illness, and the necessity for early diagnosis and medical care. Nose, throat, and dental operations, unless required as an emergency, should not be done in the presence of an increased incidence of the disease in a given community.

Patients with scarlet fever and other hemolytic streptococcic infections of the upper respiratory tract are quarantined for a minimum period of 14 days after the onset and thereafter until the nose, throat, glands, and ears are normal on inspection or until the physician reports complete clinical recovery. Patients with whooping cough are quarantined until three weeks after the appearance of the paroxysmal cough. Susceptible child contacts living on the placarded premises should be quarantined until termination of the isolation period of the patient. Diphtheria patients or carriers are quarantinued for at least seven days after the onset of the illness or the diagnosis of the carrier state and thereafter until two successive cultures from both the nose and the throat taken not less than 24 hours apart are negative for diphtheria bacilli, or when the virulence test proves the bacilli to be avirulent. General measures should include active inoculations of all children, especially those under 1 year of age, and frequent booster doses to maintain adequate immunity. Patients with smallpox are quarantined for a minimum of 21 days and thereafter until all lesions have healed and the scabs have fallen off. General measures should include general vaccination in early infancy, revaccination of children on entering school, and vaccination of the entire population when the disease appears in a community. The use of multiple pressure vaccination is recommended.

DESTRUCTION OF FUNGI IN SHOES

TO THE EDITOR:—*What substances can be put inside shoes or boots to prevent reinfection with epidermophytosis?*

F. J. Vurpillat, M.D., South Bend, Ind.

ANSWER.—Until recent times, shoes were sterilized by placing them in a box with a small, open dish filled with 10% "formalin." The box was sealed and the shoes exposed to the vapor for at least six hours. This procedure, however, sometimes damaged the leather; therefore, some persons have attempted to kill the fungi inside the shoes by exposing them to sunshine for a few hours. The efficacy of this procedure is not proved. Recently, "carboxide gas" (containing 90% carbon dioxide and 10% ethyleneoxide) was used successfully for sterilizing shoes (Fulton, J. D.; Mitchell, R. B., and Morhouse, C. H.: Sterilization of Footwear to Prevent Reinfection with Tinea Pedis [Athlete's Foot], U. S. A. F. School of Aviation Medicine, Randolph Field, Texas, November, 1950). The "carboxide" sterilization is best done in an autoclave. The autoclave is evacuated to two-thirds of atmospheric pressure and "carboxide gas" is admitted up to 20 lb. of positive pressure. Hot steam is allowed to circulate in the jacket, so that the internal temperature is around 50 C (technique of B. Church and C. G. Loosli, to be published). Under these conditions, all species of pathogenic dermatophytes are killed after an exposure of 8 to 10 hours, and the shoe leather is not damaged.

Fungistatic dusting powders, such as 1 to 2% sulfur in equal parts of zinc oxide and talc or one of the more modern and nonirritating preparations, such as desenex® powder or asterol® powder, if dusted liberally into the socks and shoes, will inhibit the growth of dermatophytes but will not kill them. These preparations are satisfactory in preventing and controlling the clinical disease. A number of experts in this field do not believe that reinfection from shoes plays any role in flare-ups of dermatophytosis of the feet. The dermatophytes may be dormant in the nails or in the horny layer of the epidermis and may cause clinical disease at any time when local factors (mainly, moist heat [sweating] and maceration of the horny layer) become favorable for their growth.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

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TYPHOID IMMUNIZATION AND AGGLUTINATION TESTS

To the Editor:—*A 10-year-old child became ill with a temperature of 103 F, which continued with chloramphenicol (chloromycetin®) therapy (1 gm. daily) for 11 days and ended by crisis. He had pain in his left hip, which was relieved by penicillin therapy. A roentgenogram of his hip on the fourth day of his illness was normal. At the same time, his chest showed a pneumonic process in the right base, which disappeared three days later. He had no gastrointestinal symptoms or splenomegaly. His white blood cell count, determined on several occasions, was 6,000, with 75% polymorphonuclear leukocytes and 25% lymphocytes. He had a negative reaction to an intradermal tuberculin test (1:1,000 dilution). His reactions to all agglutination tests were negative, except for those with paratyphoid A and B (O agglutinins) in dilutions of 1:640; these two tests were repeated two days later, and his reaction was still positive. After his temperature dropped, the hip pain continued, and roentgenograms revealed degenerative changes. Additional pencillin was given. His agglutination titer dropped in one month to 1:160 against paratyphoid A and B (O agglutinins). This child has received yearly doses of triple typhoid vaccine, and he received the last dose three months prior to the onset of this illness. Can an absolute diagnosis be made solely on the agglutination tests? Would not the titer rise rather than fall if a paratyphoid infection existed? What influence does triple typhoid immunization have on the agglutination tests?* *M.D., Kentucky.*

Answer.—In the case cited, an absolute diagnosis could not be made on the basis of an agglutination test. Following administration of triple typhoid vaccine, agglutinins may appear in one week, reach their peak in three weeks, and then gradually diminish. If there had been a paratyphoid infection, the titer would have been expected to rise instead of decline. Triple typhoid immunizations should promote positive reactions to agglutination tests; however, after one year, an agglutination test may be negative, and yet there may be sufficient antibodies in the blood to insure a fair degree of immunity.

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RESTLESS LEG SYNDROME

To the Editor:—*I have often been consulted, especially by women, about restless legs or "Jimmy legs." Please give information as to treatment.*

W. M. McRae, M.D., Little Rock, Ark.

Answer.—The restless leg syndrome is frequently encountered in the practice of neuropsychiatry. It is characterized by an indescribable, unpleasant sensation occurring in the lower extremities. The sensation is not that of numbness, tingling, or prickling (true paresthesia). It appears at rest, most often when the patient tries to go to sleep, but at times while he or she is sitting. It is relieved by movement, and it varies in intensity. Examination of the nervous and vascular systems discloses no abnormalities that can be considered causative, even though the symptom may have been present for years.

Some authorities think of this complaint as a compulsive symptom that occurs often. Others, notably K. A. Ekbom of Stockholm, attribute the stature of a syndrome to the symptom. Ekbom stated that, in many cases, the condition is relieved by priscoline® (2-benzyl-2 imidazoline hydrochloride), carbaminoylcholine chloride (carbachol®), or glyceryl trinitrate (nitroglycerin). The complaint is relatively stubborn, but one that can, at times, be relieved by sedatives. One patient obtained relief by wrapping the legs with an elastic bandage. Treatment formulated according to the needs of the patient as a whole seems most likely to succeed.

References:

Ekbom, K. A.: Asthenia Crurum Paraesthetica (Irritable Legs). New Syndrome Consisting of Weakness, Sensation of Cold and Nocturnal Paresthesia in Legs, Responding to a Certain Extent to Treatment with Priscol and Doryl, Acta med. scandinav. **118**: 197-209, 1944.

Ekbom, K. A.: Restless Legs: Clinical Study of Hitherto Overlooked Disease in Legs Characterized by Peculiar Paresthesia ("Anxietas Libiarum") Pain and Weakness, and Occurring in 2 Main Forms, Asthenia Crurum Paraesthetica and Asthenia Crurum Dolorosa: Short Review of Paresthesias in General, Acta med. scandinav, suppl. 158, pp. 1-123, 1945.

Ekbom, K. A.: Restless Legs: A Report of 70 New Cases, Acta med. scandinav., suppl. 246, pp. 64-68, 1950.

CLASSROOM ILLUMINATION

To the Editor:—*I have been asked about the minimum and optimum amount of light for school classrooms, as expressed in candle-foot power. How much light must be supplied to eliminate eyestrain for the student?* *M.D., Connecticut.*

Answer.—The question of correct lighting for schoolrooms is controversial; however, there is growing agreement on limits of from 20 to 40 foot candles. It is recommended that classroom lighting be checked with a foot-candle meter and any situation above or below these standards corrected. Obviously, the higher intensities would be most desirable for certain visual tasks such as typing in commercial courses, sewing in home economics, and mechanical drawing in industrial arts. On the other hand, the lower intensities would serve satisfactorily in places like gymnasiums and halls. Reasonable uniformity in lighting in all parts of the room and for all pupils should be the goal. Equal attention should be given to the elimination of glare resulting from unshielded lights and rays of the sun and of glare caused by reflections from glossy surfaces. Children should be protected from excessive differences in light-reflection factors in the schoolroom by reducing strong contrasts in color of desk surfaces, floors, woodwork, and walls. These aspects of the problem, glare and contrast, have lately been considered as important or even more so than the intensity of the illumination.

URTICARIA

To the Editor:—*A man, 52 years old, who is obese, feels that there is something wrong with him. I have consulted several physicians, and none of them can determine what it is. The patient has multiple lipoma nodules all over his body; some come and go, but others are permanent. Patches of urticaria nodules develop at various times of the day, and his upper lip gets swollen at times. This swelling occurs suddenly, lasts for two to six hours, and then quickly disappears. He also has psoriatic lesions between the fingers that sometimes cause itching. His bowel movements are regular, his urine is negative to all tests, and, except for the above symptoms, he feels well.*

Epinephrine (adrenalin®) and other medications have been tried, without permanent results. Roentgen therapy, diets, saline laxatives, and baths, hot or cold, have not corrected this condition. Can you offer any suggestions concerning this case? *Alfred J. C. Schwartz, M.D., Washington, Mo.*

This inquiry was referred to two consultants, whose respective replies follow.—Ed.

Answer.—This man apparently has chronic urticaria with lesions of angioneurotic edema. Lipomas are not expected to come and go, and the absence of fever and depressed scars eliminates the possibility of nodular nonsuppurative panniculitis. It also is likely that the itching lesions limited to the areas between the fingers are not psoriasis. Perhaps they are infectious lesions such as those caused by moniliasis. The source of his trouble, however, should be sought in hypersensitivity to either drugs, infections or foods, in a psychogenic cause, or in some unusual source, such as a physical factor, parasite, or inhalant. During the search for the source of the trouble, treatment should consist of administration of antihistaminic agents, colloid baths, and the application of soothing lotions.

Answer.—The presence of urticaria and angioneurotic edema cannot be debated. It is not so certain, from the description, that the nodules thought to be lipomas are actually composed of fatty tissue. The shifting pattern of these nodules suggests that they may also be of an urticarial nature. There is a type of urticaria in which the lesions are indurated and persist for long periods in the same sites. It may be justifiable, in this case, to section one of the nodules and to study its histological structure.

Basically, the urticarial aspect of this case resolves itself into two aspects, the etiology and the treatment. Urticaria and angioneurotic edema may be classified etiologically into two groups, allergic and nonallergic. For the allergic group, drug allergy ranks high in importance. Does the patient use antibiotics (even nose drops), aspirin, or other analgesic drugs, barbiturates,

phenolphthalein, or other drugs? Foods can also cause urticarial lesions. Neither foods nor drugs are likely to give positive skin tests in such cases; hence, a diagnosis must be made or eliminated by history, observation, drastically restricted diets, and ingestion trials. Infected tonsils, teeth, or gallbladder may constitute a basis for the urticaria. Emotional and other nervous factors should not be disregarded; however, it must be admitted that the causes of a large percentage of cases of urticaria and angioneurotic edema still remain unsolved.

The most effective and simplest palliative therapy has been the use of antihistamines. Some patients require two or three times the usual recommended doses. The addition of ephedrine to the antihistamine may help. The occurrence of the lip lesion might be averted by avoidance of smoking or other possible local traumatic stimuli. Some physicians have found that histamine injections, beginning with small doses and frequently repeated, have been helpful. Various forms of nonspecific therapy have been tried. Corticotropin (ACTH) or cortisone would be worthy of trial if the condition fails to respond to other measures.

MANGE

To the Editor:—*There has been much discussion by our staff regarding mange. Please discuss etiology and transmittal from dogs to humans and proper treatment, especially roentgen therapy.*

J. E. Miller, M.D., Yonkers, N. Y.

Answer.—Mange is a cutaneous affection of dogs and other animals caused by arthropod parasites. These invertebrates have jointed legs and burrow into the deep layers of the skin, where they are thought to feed on lymph and young epidermal cells. Regarding transmissibility of these parasites, mites belonging to the same genus are usually parasitic on a number of mammals, including man. The varieties are usually specific to their host.

In the case of the dog, there are three kinds of mange mites: Sarcoptes scabiei, Otodectes cynotis, and Demodex canis. Successful treatment of mange is not easy and depends on combining active drugs with a suitable vehicle that will penetrate to the deep layers of the skin where the mites live. Drugs, such as the sulfur compounds, rotenone (a poisonous compound, $C_{23}H_{22}O_6$, from derris root and other roots), benzyl benzoate, and chlordane are useful. No references to beneficial effects of roentgen therapy were found.

LIVING WITH CATS

To the Editor:—*A woman, 55, has a fondness for cats, with which she shares her room and bed. Her window is always left open so the cats may go and come at will. The room is shockingly ill cared for, with dirt brought in by the cats' feet on the floor and bed. The cats' dishes are the same as those used by the family. For excreta there is a box of earth, changed daily, for young kittens. Is there any risk in living in such amazing intimacy with cats?*

M.D., California.

Answer.—Such intimacy with pet animals is not uncommon and, apart from the aesthetic or sanitary standpoint, should not be viewed with alarm. There is, of course, always a possibility of mechanical transfer of germs and parasites picked up by the cats while roaming, but the consensus is that the risk is small. Any corrective effort on the part of the physician or public health workers is likely to end in failure, unless it can be established that the situation creates a health hazard to neighbors. The cats may be suspected if a case of hookworm develops in this family. Also, the danger of rabies transmission should not be overlooked, notwithstanding that this disease occurs much less frequently in cats than in dogs.

IODINE DERMATITIS

To the Editor:—*A patient has had dermatitis of the face from ingestion of iodides for the past year. What type of therapy might hasten healing of the skin lesions?*

John Tocco, M.D., Endicott, N. Y.

Answer.—It might be helpful to administer sodium chloride either intravenously or orally by means of tablets or plain salt in water. In addition, the patient should avoid eating sea foods and using iodized salt, either in cooking or as table salt. The ingestion of bromides also should be avoided.

VACCINES FOR FURUNCULOSIS

To the Editor:—*What is the present status of vaccine and toxoid therapy for chronic or recurrent furunculosis due to staphylococci? Are toxoids more effective than vaccines? Are stock vaccines comparable in effectiveness to autogenous vaccines?*

M.D., Texas.

Answer.—There is a wide difference of opinion about the value of vaccines for the treatment of recurrent furunculosis. They are being employed much less frequently since the introduction of the antibiotic drugs. Some physicians still employ them for patients who do not tolerate antibiotic drugs or respond to treatment with them, and, though they consider toxoids less likely to induce untoward reactions, they deem the autogenous vaccines to be more effective than stock preparations. Such vaccines should be prepared properly to assure a minimum of destruction of antigenicity, and they are best administered intradermally.

PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY

To the Editor:—*In* The Journal (**146:**768 [June 23] 1951) *under Queries and Minor Notes is a question about pseudohypertrophic muscular dystrophy. While it is true that the cause of muscular dystrophy is unknown and no specific treatment for the disease has proved of value, definite benefit can be achieved through neuromuscular rehabilitation. In addition to the decline in function that occurs from the muscular degeneration in the dystrophic process, there is undoubtedly additional loss of muscle power, endurance, and skill, and further muscular atrophy from enforced inactivity and disuse. An intensive neuromuscular reeducation program overcomes the effects of disuse and results in significant decrease in disability, in spite of the steadily progressive character of the disease.*

Since 1948, we have worked with 44 patients with progressive muscular dystrophy and have brought about significant improvement in most of these patients. In almost all of these cases the progress of the dystrophic process was so slow that although the disease process undoubtedly continued, the patients' ability to do things improved significantly. Other principles of rehabilitation that have been of value in the treatment of patients with progressive muscular dystrophy include self-care training, gait training, training of skills and occupational therapy, use of braces and assistive devices, and, in some cases, orthopedic surgery. Improvement in morale, psychological outlook, social adjustment, and vocational training and placement have been important in the rehabilitation process.

Herman Kabat, M.D.
Kabat-Kaiser Institute
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SEQUELAE OF HYDROCYANIC ACID POISONING

To the Editor:—The Journal, *Feb. 16, 1952, page 589, stated in a reply to a query regarding "Sequelae of Hydrocyanic Acid Poisoning" that this poison can be chronically toxic and may cause neurological symptoms after a single subfatal exposure.*

It is generally accepted that chronic poisoning refers to the toxic effects of continued exposure to concentrations that do not cause acute toxic symptoms. The opinion of toxicologists on the existence of such chronic cyanide poisoning in humans is at variance, but even those who believe in its existence agree that its symptoms are not permanent after discontinuation of the exposure.

There is no doubt that acute hydrocyanic acid poisoning leading to prolonged unconsciousness (anoxia of the central nervous system) may leave more or less permanent injury, especially of the central nervous system. These, however, are chronic injuries and should not be called "chronically toxic." I am afraid that statements such as this one are open to misinterpretation.

I may perhaps also point out that the reference to Sollmann is not correct. It should refer to page 713 and not to page 203.

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